



सत्यमेव जयते

INDIAN AGRICULTURAL
RESEARCH INSTITUTE, NEW DELHI

I.A.R. I.6.

GIP NLK—H.3 I.A.R.I.—10-5-55—15,000

The
Gardens' Bulletin
STRAITS SETTLEMENTS

A Journal reflecting the activities of the Botanic
Gardens of the Straits Settlements, published
as material is available.

Vol. III.

Singapore
Printed at the Methodist Publishing House
1923—1925

DATES OF PUBLICATION.

Parts 1-3	issued August, 1923	..	..	pp.	1-120
„	4-6	issued April 15th, 1924	..	..	„ 121-244
„	7-8	issued Nov. 7th, 1924	..	..	„ 245-302
„	9-12	issued March, 1925 ..	..	..	„ 303-466

CONTENTS.

Vegetation Studies

A Botanical Reconnaissance upon the Main Range of the Peninsula at Fraser Hill	19
The vegetation of Gunung Belumut in Johore ..	245
The flowering plants of Taiping	303

The Malaysian Flora

The as-yet botanically unexplored parts of the Malay Peninsula	8
Haplochorema sumatranum	18
A Botanical Reconnaissance upon the Main Range of the Peninsula at Fraser Hill	19
Cleome (Helidonii Linn. f. in the Malay Peninsula ..	280
The Floras of the Malay Peninsula, Borneo and the Philippine Islands	283
A Note on Semecarpus (urtisii, King	290
Orchid Notes	12, 292
The flowering plants of Taiping	303

Economic Plants

(a) <i>Yams</i>	
A spiny yam from Sumatra	3
Tahitian yams	4
Yams at the Malaya-Borneo Exhibition ..	5
A list of oriental vernacular names of the genus Dioscorea (with 11 maps)	121
Varieties of Dioscorea pentaphylla in Malaysia ..	258
Dioscorea piscatorum or Tuba-ubi, a fish-poison ..	260
(b) <i>Coconuts</i>	
The fertility of branched coconut palms ..	1
Branched coconuts and their fertility	274
A study of the coconut flower and its relation to fruit production	261
(c) <i>Rubber</i>	
Two hybrid trees of Hevea braziliensis x confusa ..	237
(d) <i>Lettuce</i>	
An experiment with Lettuces	2

Morphology of Plants

The fertility of branched coconut palms	1
Branched coconuts and their fertility	274
Branching in Arenga pinnata	2
Abnormal inflorescences of Elaeocarpus petiolatus ..	11
Stenomeris in the Malay Peninsula	289

Meteorological Records

Rainfall in the Botanic Gardens, Singapore and Penang		
	1921-111, 115, 119	
	1922-113, 117, 120	
	1923	297
	1924	160
Relative Humidity, Botanic Gardens Singapore		
	1923	301
	1924	159

Drugs

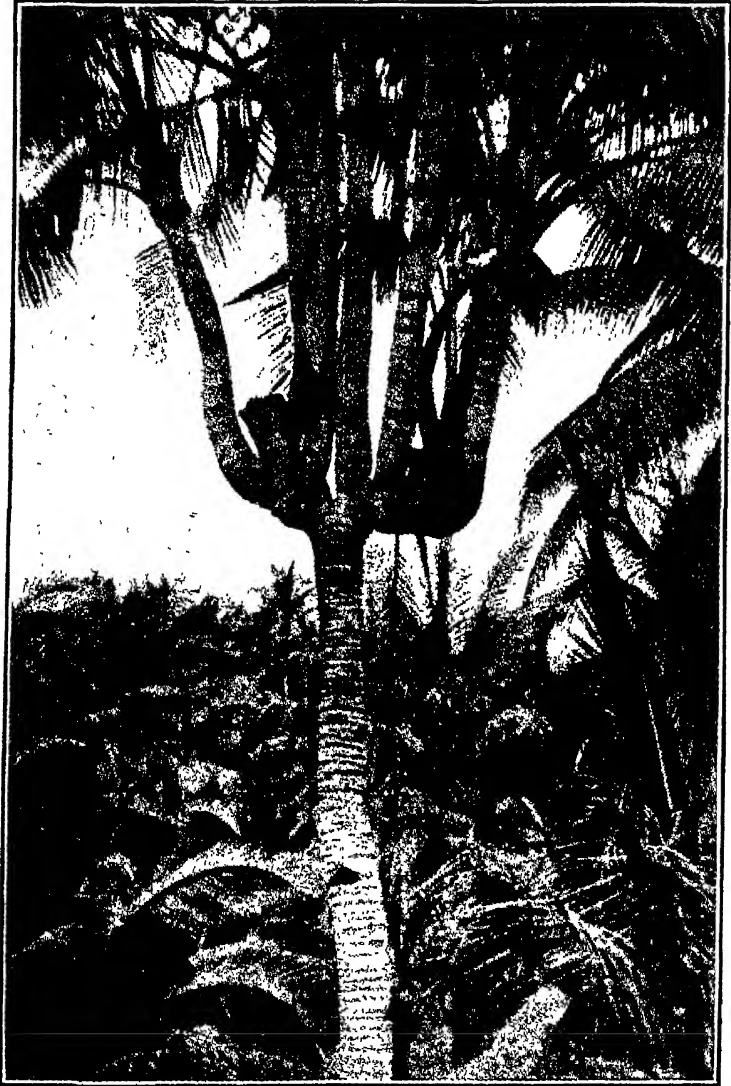
A Chinese belief regarding <i>Phyllocactus Hookeri</i> , Walp	280
<i>Cleome chelidoni</i> Linn. f. in the Malay Peninsula ..	280

Various

Observations on the expansion of <i>Dictyophora indusiata</i> , Desv. ..	281
Mosquito larvae in the pitchers of <i>Nepenthes</i> ..	283

PLATES.

Facing p.	1	Branched coconut palm at Bachok, Kelantan.
..	1	(a) A spiny yam from Sumatra.
..		(b) Yams from Tahiti.
..	7	Some yams of the Malay Peninsula and Borneo.
..	245	Summit of Gunong Belulut, with shoulder high scrub containing <i>Matonia</i> .
..	247	At the junction of the <i>Matonia</i> -scrub with the mossy forest, on the western ridge of Gunong Belulut.
..	251	Typical mossy forest, near the summit of Gunong Belulut, upon the south face.
..	258	Tubers of three varieties of <i>Dioscorea pentaphylla</i> .
..	289	Tubers of a <i>Stenomerenis</i> .



Branched coconut palm at Bachok, Kelantan.
From a photograph sent by Mr. F. G. Crosste.

THE GARDENS' BULLETIN, STRAITS SETTLEMENTS.

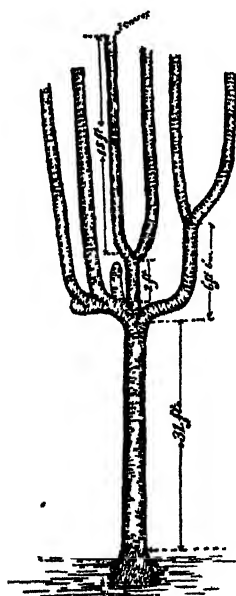
Vol. III

Issued August 1923

Nos. 1-3.

THE FERTILITY OF BRANCHED COCONUT PALMS.

In a paper in the *Annals of Botany*, xxi, 1907, p. 420, Mr. H. N. Ridley gave an account of an abnormally branched coconut palm standing upon Perseverance Estate in Singapore island. This tree which is figured upon his plate xxxvi, he was told had never fruited: and the idea that branched coconut-palms are sterile, seems to be general: but it is not absolutely true. Reports of fertile branched coconut palms in New Guinea and in the West Indies have been noticed, and the matter is discussed in Hunger's *Cocos nucifera* (2nd Edition, Amsterdam, 1920) pp. 218-226.



At Geylang on land adjoining the Perseverance Estate there stands at the present time a forked coconut palm. It is sterile now, but is said to have borne fruit.

In Penang island upon a coconut plantation near Tanjong Bunga stands a palm branched as in the annexed drawing by Mr. Mohamed Haniff. It has seven branches and the stumps of two additional ones. Mr. Mohamed Haniff has ascertained that all the fully crowned branches are fertile, and the palm is fruiting now. The tree is said by an old Malay on the Estate to be 45 to 50 years in age.

Mr. Frank G. Crosslé has supplied the following information and the photograph reproduced here of a branched coconut to which the following relates "The tree is upon the outskirts of the village of Bachok, Kelantan. It is said that once it had fourteen branches, and that five have died off: the stumps of two of these can still be seen. The height is approximately 25 feet high from the ground to the place where it divides. It has now started to bear fruit, three nuts on three different branches, which have matured."

Mr. Crosslé continues that he has heard of several branched coconut-palms before, and knows one at Kretay in Trengganu, but that he has never heard of one bearing fruit.

Further information upon branched trees occurring elsewhere would be valued.

I. H. BURKILL.

BRANCHING IN ARENGA PINNATA.

A young palm of *Arenga pinnata* Merr. (*A. saccharifera* Labill.) planted out as a replacement in the Arenga Avenue of the Botanic Gardens suffered in 1920 injury to its terminal bud. This bud was replaced by an axillary bud from one of the uppermost axils, and that bud is now commencing to produce a trunk. The possibility of this palm branching has not been recorded before.

I. H. BURKILL.

AN EXPERIMENT WITH LETTUCES.

In the end of 1921 lettuce-seed of a number of different races was ordered from England and from France, with the object of ascertaining the best races for local cultivation. The seed duly arrived,—twelve races from Messrs. Sutton and Sons, Reading, England, and 15 races from the firm of Vilmorin-Andrieux and Co., Paris. Of the english races eight were cabbage lettuces and four cos lettuces; and of the french races twelve were cabbage lettuces and three cos. The seeds were sown on November 21st, in a mixture of sand and burned earth, and germination was very satisfactory in forty-eight hours. When the seedlings were 2—3 inches high,—that was in 7—9 days,—they were transplanted into beds, care being taken to do it only when the sun was off the beds.

and set out in rows nine inches apart. A fortnight later they were manured by pouring an emulsion of cow-dung into runnels between the rows. In 41-44 days they were mature, the maximum weight being five ounces.

The lettuces were then sent out in pairs to friends willing to endeavour to judge their table value, each pair with a voting paper. These voting papers showed that the english race was preferred to the french in four cases, and the french to the english in one, while as regards the others the votes cast were roughly equal. The four races of english origin judged better than the french race against which each was pitted, were:—Sutton's Golden Ball, Standwell, Improved Tom Thumb and Satisfaction: the french race judged better than its english competitor was Vilmorin's All-the-year round.

On the whole it appears that from the salad standpoint only races favoured in England are a little better suited to Singapore than races favoured in France.

The races named above are not the only races which did satisfactorily. Sutton's Heartwell, Whiteheart Ideal, and Nonsuch made good in growth, as also did Vilmorin's Large White Stone, Balloon, Neapolitan, Green Madrid and May King.

The experiment, however, must not be considered as final. The chinese cook comes in, and the way in which he served the trial lettuces must have varied. Few know just how a lettuce should be treated, and the cook is not one of them. A lettuce for salad should be allowed just to get flaccid, then an hour before serving it should be plunged into pure cool water, which it will take up the more greedily for the flaccidity and it will be the crisper and better when eaten. But at any rate the chinese cook would treat both competing lettuces with equal disregard to their best.

J. LENNON.

A SPINY YAM FROM SUMATRA.

In the whole vegetable kingdom there are very few instances of the conversion of roots into spines, and these almost without exception in Monocotyledons; *e.g.*, some palms, one of the Iridaceae and a few species of *Dioscorea* such as *D. esculenta* and *D. prehensilis*.

A new and divergent instance is now added in the undescribed *Dioscorea* from Sumatra which is here figured. This *Dioscorea* converts the roots arising on its tubers into spines, and they may cover the whole surface: thus it wears an armour against the depredations of wild pigs etc. It is otherwise with the Asiatic *Dioscorea esculenta* and the African *D. prehensilis* where the spines are the lateral rootlets of long specialised roots produced above the yam and distributed around it in a way that would on the whole

seem to be more effective, because the spines persisting from the year before protect the succulent root of the new year; but the interest of a different method of getting cover is not reduced thereby.

I. II. BURKILL.

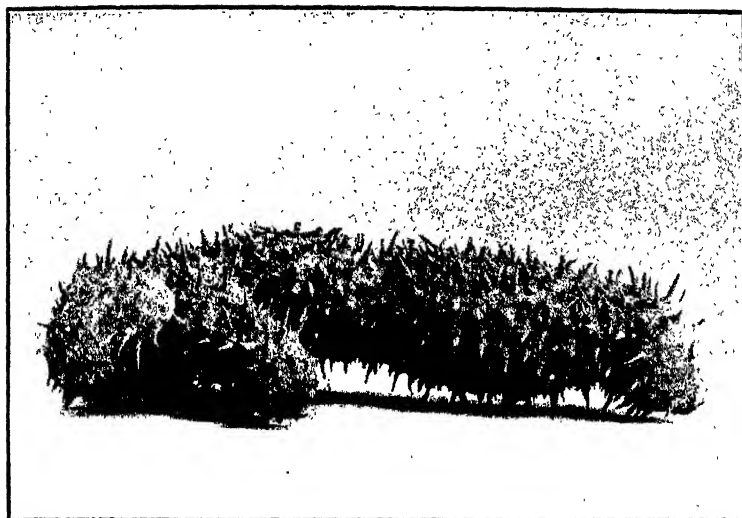
TAHITIAN YAMS.

The statement made in this Bulletin vol. I, 1917, p. 396, that *Dioscorea esculenta* does not penetrate the Pacific to the eastward of Fiji is now proved incorrect. Its tubers have been sent to Singapore by the great kindness of Professor Harrison Smith; who has supplied also all the other yams which he could get wild or cultivated in the neighbourhood of Papeete. They are figured upon the accompanying plate.

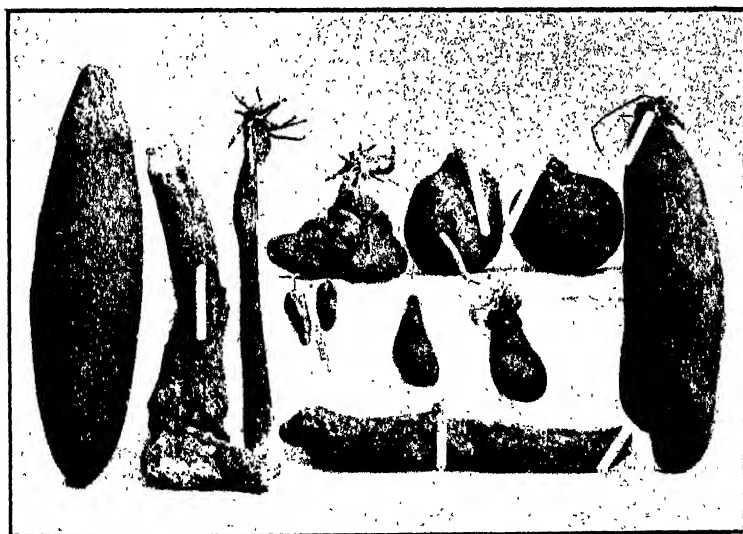
The great yam, *Dioscorea alata*, Linn. is the most important to the Tahitians of these roots. They grow it in several races, such as *ufi laho-laho* (No. 1 on the plate) and *ufi opura* (No. 10), both being large rather long yams, as *ufi mene-mene* (Nos. 4 and 5) which has neat round tubers, as *ufi tiuuu* (No. 9) which is long and deep going, and as *ufi papuraten* (No. 2) which is very long and deep going.

The first crop raised in Singapore from these showed above ground differences between *ufi laho-laho* and *ufi opura* in the frills on the angles of the stems, the first having them green and the second having them purple, in a slight carliness in *ufi laho-laho*, and in the lobes of its leaves being larger less rounded and somewhat uprising in comparison with those of *ufi opura*. There were three tubers got from each, the largest of *ufi laho-laho* weighing 5525 grammes, and the smallest 2607 grammes (average 3957 grammes) the largest of *ufi opura* weighing 4590 grammes, and the smallest 2352 grammes (average 3825 grammes). *Ufi papuraten* returned an average of 3230 grammes; *ufi tiuuu* of 2230 grammes; and *ufi mene-mene* of 2253 grammes.

No. 6 in the plate are tubers of *Dioscorea esculenta*, Burk.,—the lesser yam, which Professor Harrison Smith obtained with the name *ufi hoi*. Further *Dioscorea bulbifera*, Linn., (No. 3 on the plate) was given to him under the same name, with the explanation that whereas the first is edible, the latter relatively is not. It is most interesting that the edible and the relatively inedible should not have been distinguished by name; and it would seem therefore that the first though edible is really a very little known and used food. Again the name is interesting for *ufi* and *hoi* both have the meaning "Yam" and nothing more, in the centres of their use: and the Tahitian when he says *ufi hoi* says yam-yam in two different, but closely related, languages. This in itself, apart from the confusion of the cultivated with the wild root, suggests a recent introduction of the tuber.



A spiny yam from Sumatra.



1

2

3

4

5

6-6

7

8

10

in two
parts,

9

Yams from Tahiti.

Hoï, one may surmise came to the Tahitians from Hawaii, but *ufi* belongs to their language absolutely, being their form of *ubi* or yam in Malay, and certainly represents a very old root in the language as it is in Madagascar as *of*.

The last species, *Dioscorea pentaphylla*, Linn., is No. 6 and 8 on the plate. The Tahitians call it *ufi patura* a name to be found in Nadeaud's *Plantes usuelles des Tahitiens*, and possibly a more sought food with those people fifty years ago, which is when Nadeaud was in Tahiti, than now. It grows wild, and does not even in cultivation return more than 1 kilo by weight of tubers.

I. II. BURKILL.

YAMS AT THE MALAYA-BORNEO EXHIBITION.

The Malaya-Borneo Exhibition (Singapore, April, 1923) with its agricultural and horticultural objects collected from all parts of the Malay Peninsula, from Sarawak and from Brunei offered an unequalled opportunity of collecting information regarding native crops and was so used. Then at its winding up, through the Committee for the Agri-Horticultural Section exhibitors were persuaded to give many of their exhibits to the Botanic Gardens, notably roots, and from among them a set of yams went into cultivation in the Economic Garden for better study. This is a report upon them.

Of their genus, -the genus *Dioscorea*,—four species were exhibited in abundance in the following order:—

- Dioscorea alata*, Linn.—the Greater Yam,
- Dioscorea esculenta*, Burk.—the Lesser Yam,
- Dioscorea hispida*, Dennst.—the Gadong,
- Dioscorea bulbifera*, Linn.:

of all four species there were exhibits from the Malay Peninsula; of the first two from Brunei; and of the first from Sarawak.

Incidentally it was observed that Yam-scale exists in Malacca, Klang, Pahang and Brunei.

The tubers after a preliminary disinfection, were planted on April 21st. They were dug again on January 6th., 1923.

THE GREATER YAM.

Two races of the Greater yam from Singapore have already been figured in the Gardens Bulletin (vide Plate III in the issue of March 31st, 1917, Vol. 1, part 11-12) being what are called in the markets of the town Ubi nasi (rice yam) and Ubi merah (red yam). It was known before the Exhibition occurred that both these races are cultivated also near Klang, and that Ubi merah comes freely into Malacca town from the country behind it. It was therefore not surprising to find the race commonly sold in

Singapore as "Ubi nasi" on exhibition from Klang. It is a heavy-yielder, and three hills cultivated in the Botanic Gardens from the Klang specimen returned 13 lbs., 8 lbs. 2 oz., and 6 lbs. respectively.

This Ubi nasi grows to 18 inches or more in length, and for most of the Peninsula seems to be the deepest going yam that is cultivated. But in the Exhibition from Sungei Terap, Kinta district, a Chinese cultivator exhibited a single root of one of those races which go still deeper, and which do not seem to be in favour for the soil and with the cultivator in this country, though they usually have a greater delicacy. It was interesting to learn thus that deep-going yams, though scarce, exist.

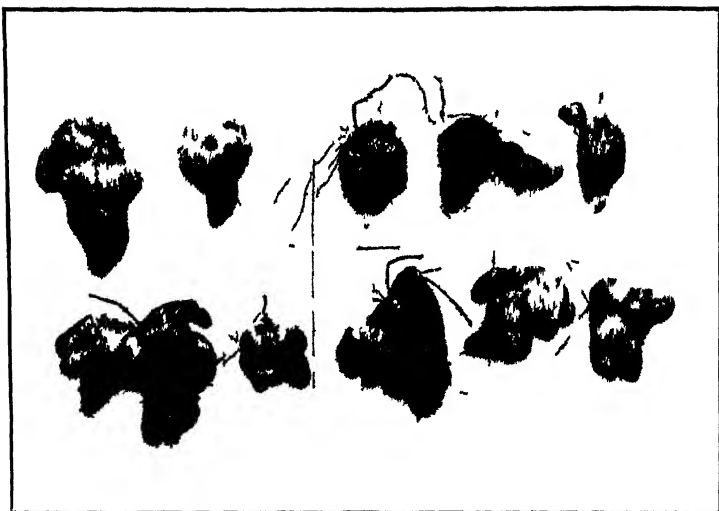
Judging by the Exhibition, the yams which find favour in the Peninsula are such as are represented on the upper block of the attached plate. They may be circular in section as those upon the upper line, or flattened as those in the lower: when they are flattened, they are also lobulate as the illustrations show. Races characterised by producing tubers that are circular in section were exhibited from Klang, Malacca, and Pekan: races with their tubers flattened and lobed were received from Krian, Kuala Kangsar, Temerloh, Klang and Alor-Gajah. Two of these, one circular from Klang, and one flattened from Temerloh, both without any magenta sap, carried the name ubi nasi, which indeed in general does not signify any particular race, but indicates a tuber of the ordinary downwardly-growing habit which boils white, like rice, as it has no magenta sap in it: the name indeed contrasts with ubi merah. One of the tubers circular in section, but with magenta sap was labelled at Klang ubi java (Java yam), and one of the flattened tubers with magenta sap was labelled at Alor-Gajah ubi paha kerbau (buffalo thigh yam).

It is easily realised that, from a condition in which there is one yam deeply lobed, it is a step to one in which the plant produces more than one tuber. A race producing many neatly rounded small tubers was received from Malacca, which when grown in the Economic Garden returned 21 tubers from three plants.

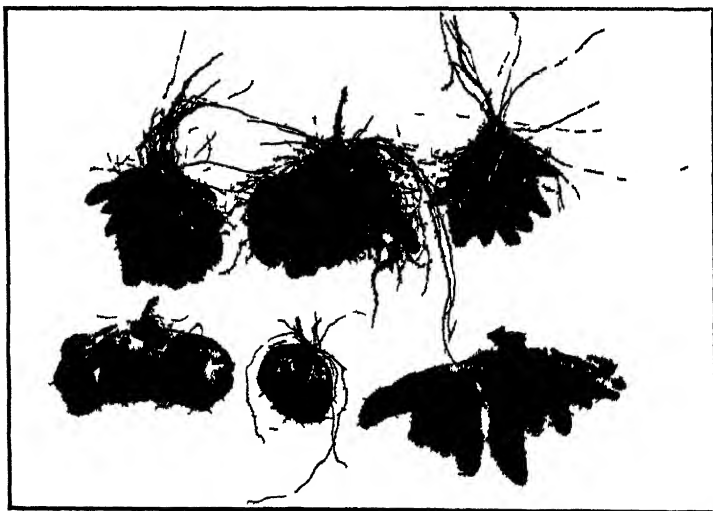
Ubi sekok from Raub, Pahang, which is the race figured on the upper line of the lower block on the plate, proved to be one of which the exact counterpart had not been seen before: it is without magenta sap, and much branched, but not in one plane only, as is usual.

Of conspicuously flattened and branched yams the Peninsula supplied a single example, namely that figured on the lower line of the lower block on the plate. It came from Klang. As such yams travel badly and are not suitable for sending to a distance, it may be that they are more common in the Peninsula than the Exhibition showed.

Very interesting it was to find from the Peninsula examples of those up-growing yams which require earthing-up in cultivation.



(X) Half long races of the Greater Yam on the upper line (left), a race with a tuber circular in section such as seems to find favour in the Malay Peninsula upper line (right) three tubers of a race from Sarawak with the habit of producing one supplementary horizontal tuber on the lower line (left) two tubers of a flattened and lobed yam from Klang which finds favour in the Peninsula and (right) three tubers of a still more lobed race received from Krian



(Y) Upper line, a peculiarly branched race of the Greater Yam sent from Raub with the name of Ubi sekok, and below (left) two tubers a flattened very smooth race from Brunei, and (right) a much flattened and branched race from Klang

SOME YAMS OF THE MALAY PENINSULA AND BORNEO.

They came from Kuala Lipis, from Krian and from Klang. The exhibitor at Kuala Lipis attached the name Ubi junjong to his exhibit. Junjong is among other things, the stake that a climber is grown up, and the name may be translated pole yam, the word "pole" being used exactly as in Pole bean. The exhibitor at Klang attached the name ubi ular (or snake yam) to what he sent. This name - ubi ular - is the name which Rumpf between 1628 and 1702, obtained in Amboina for the same type of yam, and is so appropriate that it would persist anywhere where the malay language is spoken. The Klang ubi ular differed slightly from the others in possessing a diminished tendency in the snake-like roots to curve upwards and extrude from the ground, and had no magenta sap.

These snake yams yield well; and ten hills of the Krian and Kuala Lipis race returned nearly fifty lbs. of tubers, one reaching 7 lbs., while nine hills of the Klang race yielded 64 lbs., one attaining 13½ lbs.

Malacca sent a race producing several tubers to each hill, and these subglobose. Upon the average there were eight to each hill.

From Sarawak came a yam which agrees in character with the commoner lobed yams of the Malay Peninsula, and another much flattened and branched like an open hand which has nothing precisely in common with any of the hitherto known Peninsular races.

From Brunei came another race with the flattened lobed tuber, the lobes widely divergent, figured on the lowest line of the plate. All these three carried magenta sap.

THE LESSER YAM.

The Lesser Yam was exhibited in two races from Machap in the Alor-Gajah division of Malacca, and also from Klang. Both of these carry thorns upon the specially defensive roots and therefore belong to that group of races which have been called collectively "spinosa." They both produced 6-12 tubers rather closely bunched together, much as in that race which is figured in the Gardens Bulletin for March 1917, volume I, part 11-12 upon the top row in plate IX. But they differed markedly in flavour, and differed somewhat in the colour and smoothness of the skin. The one race when cooked gave a mealy or starchy tuber, and its yellow skin was very smooth; the other when cooked gave a harder sweeter tuber, and its light umber skin carried a fair sprinkling of small rootlets. The Klang exhibitor attached the name "ubi torak" to the second.

This second sweeter race was sent also from Brunei.

GADONG.

The tubers of *Dioscorea hispida* are not edible, but can be made to furnish a large quantity of starch, and this under proper preparation is a good food. Consequently they appeared in the

Exhibition among other roots that are eaten, and some of those shown were of great size.

DIOSCOREA BULBIFERA.

This unimportant yam was exhibited from Klang and from Seremban in the variety "sativa," which produces large and numerous edible bulbils at the expense of the root-tuber. The plants raised from the tubers obtained at the Exhibition proved identical, and appear to be not different from the "Otaheiti potato" which has been grown for some forty years in India, reaching India via the Andaman islands, and is known in various islands and shores towards the Pacific. The name Ubi Kastela (Castile yam) found applied to it in Singapore suggests that the Portuguese or the Spaniards had once something to do with its dispersal.

I. H. BURKILL.

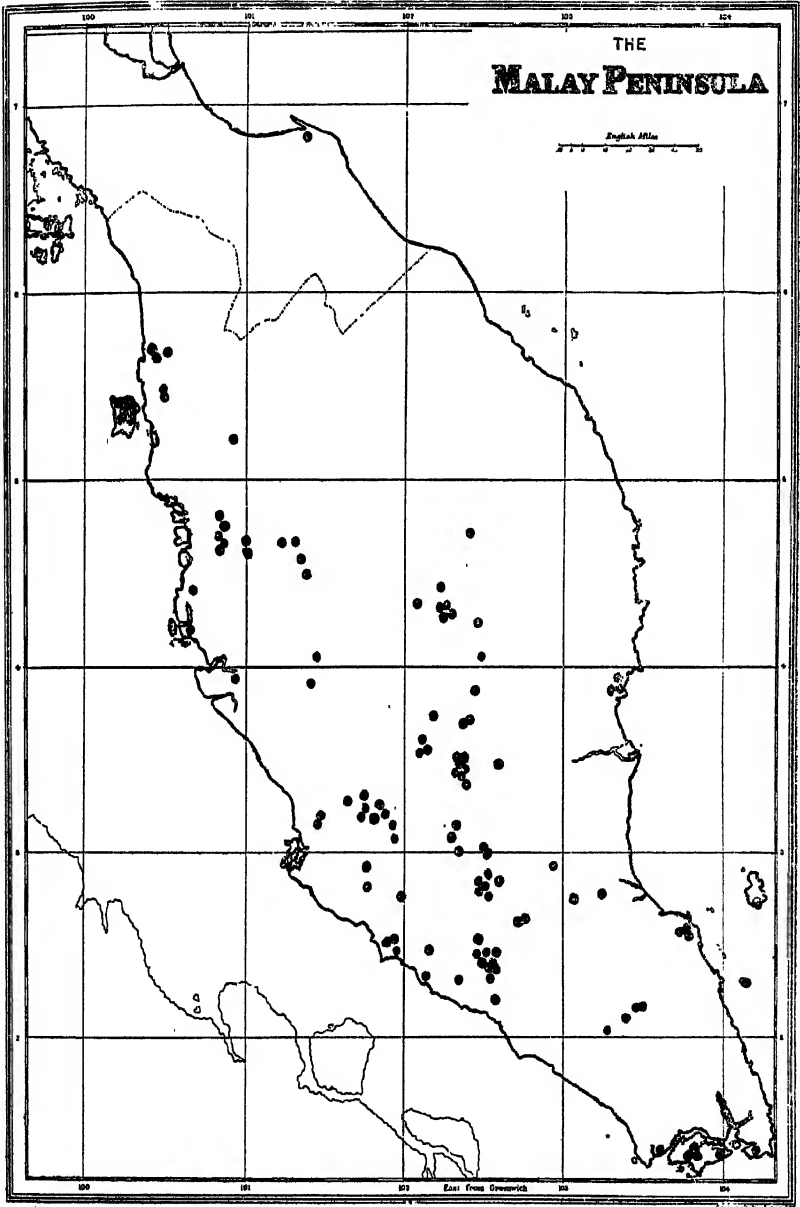
THE AS-YET BOTANICALLY UNEXPLORED PARTS OF THE MALAY PENINSULA.

The object of this note with its two maps is to indicate the parts of the Malay Peninsula which are at present botanically unexplored, and to ask for collections of dried plants from them. One of the maps is of the localities where determined species of the genus *Dipterocarpus* are known to occur; the other is of the localities where determined species of the genus *Dioscorea* are known to occur. The genus *Dipterocarpus* consists of important forest trees and their economic value has led the Forest Department to pay much attention to them: the genus *Dioscorea* consists of herbaceous climbers which do not demand attention in the same way: and for that reason the two maps are unlike although there is reason to believe that no wide stretches of the Peninsula are without representatives of either genus. As the maps show, neither genus is known from many parts, and only the one or the other from other parts.

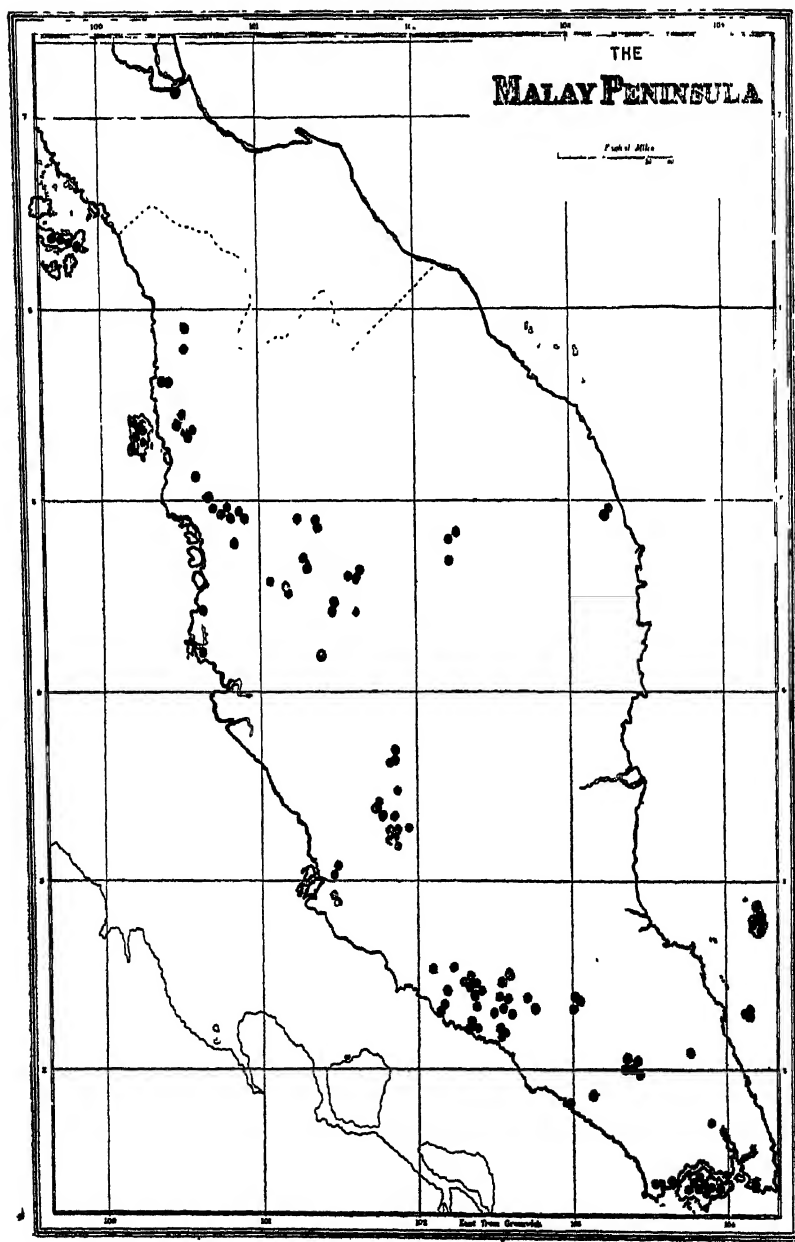
The three Settlements, Penang, Malacca and Singapore, are demonstrated the best studied; after them the parts of Perak about Taiping and north and south of Ipoh; and the parts of Selangor adjacent to Kuala Lumpur: for *Dipterocarpus* Negri-Sembilan and the middle part of the Pahang river have been studied, but not for *Dioscorea*. Large areas of Kedah, the whole of Kelantan and the whole of Trengganu, large areas of Pahang, and also of Johore are without any of the dots that indicate the occurrence of a determined species of either genus.

What is demonstrated in these two maps for the two genera is true of plants of all kinds: Collections of dried plants are wanted from all the blank parts of the maps.

I. H. BURKILL.



Known Distribution of *Dipterocarpus*.



KNOWN DISTRIBUTION OF DIPTERA

ABNORMAL INFLORESCENCES OF *ELAEOCARPUS PETIOLATUS*.

In 1921 Mr. Burkill noticed an abnormality in the development of the flowers of a tree of this species growing in the Economic Garden. Some notes were made at the time by Mr. G. B. Deshmukh, who was then Field Assistant at the Gardens. The tree has again produced flowers, and an investigation of them shows a greater complexity in their abnormal features than Mr. Deshmukh records. The unusual points are a complex branching of the inflorescence, accompanied and accentuated by the production of buds in the axils of some or all of the floral organs, and the complete sterilisation of the flowers. The final result is an elaborate branch system bearing minute buds at the apices of its ultimate branchlets. There is some variation of these phenomena in different inflorescences, and an account of these is given below. It is probable that the abnormality is not caused by any stimulation due to insect attack, but is inherent in the nature of the individual tree.

The normal inflorescence of the species is a simple raceme, and some of those on the present tree approximate to this, while others are very much branched before any flowers are produced. The flowers on the less branched inflorescences are of normal size, but in the axils of some or all of the sepals are produced buds, each of which develops into a flower on a pedicel which may reach 4 or 5 cm. in length. The stamens are normal in appearance, but never bear pollen. The axis of the flower continues to grow out above the stamens to a length of 1 to 1.5 cm., carrying some of them, reduced in size, with it. No evidence of the presence of carpels has been observed, but the organs at the apex of the produced axis are too immature to be recognisable. The new flowers are smaller than the original one but behave in the same way, and Mr. Deshmukh records that the process may be repeated four times. During the present flowering very few buds of the third order have been seen, and none of the fourth order. The flowers of each order are smaller than those of the preceding.

The smaller flowers produced by the branchlets of the more complex inflorescences and, to some extent, those of the second and third orders above mentioned show a greater degree of abnormality. The first change is the presence of buds in the axils of petals as well as of sepals. In progressively smaller flowers, on smaller branchlets, additional petals, with or without axillary buds, replace stamens. These small petals are somewhat modified in form, having a less lacinate tip and a few reddish glandular hairs like those on the margins of the sepals. In the smallest flowers of which the organs are not too small to be distinguishable all the stamens (reduced in number) have been replaced by modified petals, and some of these, with axillary buds, are carried above the flower by the continued growth of the axis. When the sepals fall,

the remains of such a flower form a rather modified branch-system of the already complex inflorescence. On the smallest branchlets the reduction in size of the flowers is so great that the floral organs are not differentiated sufficiently to be recognisable.

R. E. HOLTTUM.

ORCHID NOTES.

A NEW MALAYAN ORCHID,—*DENDROBIUM CITRINO-CASTANEUM*.

This orchid was brought to me by Mr. Poul Feddersen as an epiphyte which he had found near Johore Bahru. It is a typical *Dendrobium* of the section *Sarcopodium*, falling, in Dr. F. Kränzl's arrangement of the species of *Sarcopodium* (Engler's Pflanzenreich, IV, 50, II B. 21, p. 321), near to *Dendrobium elongatum*, Lindl., but being quite distinct from it, and not possessing the affinity to the section *Desmotrichum* which that species has. As one of the *Sarcopodiums* with rather numerous flowers, and these prettily coloured, it may not be unworthy of cultivation. The duration of the flowers, however, is unknown to me, and possibly it is a little exacting in the conditions of flowering.

Dendrobium (Sarcopodium) citrino-castaneum. *Planta* epiphytica. *Rhizoma* repens, 5 mm. diametro, ab initio vaginis tubulosis pallide virescentibus obtectum, maturitate atro-castaneum, inter pseudobulbos ad 5 cm. longum. *Pseudobulbi* conoidei, glaberrimi, politi, virides, ad 6 cm. longi, ad 2.5 cm. diametro, ex bracteis initio pallide virescentibus, deinde scariosis et atrocastaneis, maturitate liberati, bifoliati. *Folia* obovato-elliptica, ad 14 cm. longa, ad 3.5 cm. lata, glaberrima sed vix polita, firma, apice rotundata vel obtusa, mucronulata, nervis 20 vel ultra inconspicuis, supra saturate viridia, infra pallidiora. *Corymbus* pluriflorus, conspicuus, floribus 6—10: pedicelli cum ovarii 2-4 cm. longi: bractee ovato-lineares. *Sepala* citrina; dorsale ad 18 mm. longum, 5 mm. latum, lanceolatum, acutum, 7-nerve: lateralia æquilonga, mentum 6 mm. profundum formantia, ex eodem triangulari-lanceolata, acuta, 6-nervia, nervis 2 supra et nervis 2 infra medium. *Petala* citrina, 16 mm. longa, sepalis paullulo minora, angustiora, concoloria, 5-nervia. *Labellum* ex basi 1.5 mm. lata trilobatum, castaneum; limbus fere planus, crassus, 5 mm. longus: lobus medius exacte linguiformis, crassiusculus, supra sulcatus, 8 mm. longus; lobi laterales oblique oblongi, tenues, apice rotundati atque minutissime denticulati. *Gynostemium* 5 mm. longum.

JOHORE. Prope Johore bahru, *P. Feddersen*.

DENDROBIUM CALLIBOTRYS, Ridl.

From Gunong Pulai in Johore Mr. G. A. Best recently brought into the Botanic Gardens, Singapore, an orchid which on flowering

appears to be *D. callibotrys*, Ridl.: but as it does not agree with the description in some small points, a note on it is in place. Firstly he said that *D. callibotrys* is an orchid of low levels in Singapore island and adjoining Johore territory, so that the finding of it on Gunung Pulai only extends the range in a measure within expectation.

The raceme of this plant of Gt. Pulai is 5 cm. long and 9-flowered. The bracts are obovate and at flowering reflexed on to the axis: they are large concave and light green. The sepals and petals are light-yellowish green, not white as is said of the type-plant from Singapore. The dorsal sepal is obovate, obtuse, 9 mm. long: the lateral deltoid-falcate as long: the petals broadly lanceolate obtuse a trifle shorter. The lip is 12 mm. long, very markedly three lobed at the middle and at the base of the side lobes has two lateral warts extended back into crests and one median smaller wart, slightly extended back in a crest, and prolonged forward into a low ridge which runs the length of the mid-lobe: the side lobes stand almost as side walls to the entrance of the flower and are flushed from the tip down with salmon-pink: the mid-lobe is a bright lemon yellow with two grooves down it one on each side of the ridge above mentioned: it is directed obliquely downwards. There is honey; and it has a pleasant faint scent.

THE FLOWERING OF *BULBOPHYLLUM PUSTULATUM*, Ridl.

I received recently from Mr. P. Feddersen a plant of this *Bulbophyllum* with two buds upon it; and I interested myself in observing their expansion. The buds arose from the bases of the lowest two leaf-carrying pseudobulbs, and they flowered one day apart, in the order of their position. The opening of the flower commenced in the afternoon. At noon upon the next day these were as drawn, below, that is to say not yet fully expanded.



Half expanded flowers of *Bulbophyllum pustulatum*, $\times \frac{1}{2}$.

Full expansion was attained only upon the morning of the third day, and in the afternoon of the same day they began to wither, unfertilised.

The colour is a rather dark amber with crimson veins inside which show translucently through to the outer side, and with a deep crimson fleshy hinged lip, designed to fall forward when an insect alights upon it, thrusting the insect's head against the stigma and the pollinia for the purpose of pollination. The spurs of the

column are light amber, transparent and very firm. The foot is crimson and carries streaks of nectar. The lip has auricles and is hairy below: above it is slightly pitted marginally and with three shallow impressions as the drawing shows upon its face. The crimson sap does not extend through its flesh.



The lip in its natural position: and on the right the pollen masses.

CYMBIDIUM LANCEFOLIUM Hook. in PENANG.

This widely distributed orchid is rare in the Malay Peninsula; and on that account the discovery of it upon Tiger Hill, Penang, by Dr. J. S. Rose and Mr. Mohamed Haniff, is of interest. The species extends from India to Japan, and southwards to Java. In the Peninsula it has been collected on G. Bujong Malaka in the Main range, and on Bukit Sedanan in Malacca and near Nyalas, which are places between the southern termination of the Range and Mt. Ophir.

COELOGYNE CYMBIDIODES, Ridl.

This orchid was described by Mr. H. N. Ridley (Jour. Linn. Soc. Lond. Bot., xxxviii, p. 329) from dried herbarium specimens collected by Mr. H. C. Robinson upon Gunong Tahan between 3,000 and 6,000 ft. Its flower is figured here from a living plant brought into the Singapore Gardens by Mr. Mohamed Haniff. The colour is cream and chocolate.

It is one of three *Coelogynes* of close affinity; viz. *C. dayana*, Reichb. f., *C. densiflora* Ridl., and this. Of the three the first is the most widely distributed, occurring in the Peninsula and in Borneo: in the Peninsula upon the Taiping Hills and on G. Bubu; on the Main range near the Semangkok pass; on Benom; and again on Mt. Ophir. *C. densiflora* occurs on Bukit Etam, and *C. cymbidioides* on G. Tahan. It is a legitimate view to take that the second and the third are subspecies emerging from the more wide *C. dayana*.

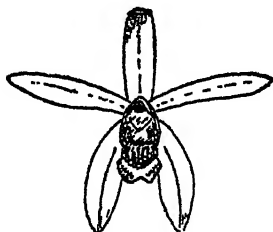
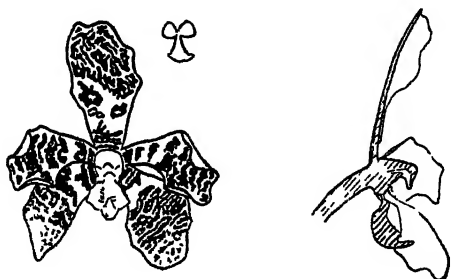


Figure of the flower of *C. cymbidioides*, $\times \frac{1}{2}$

ARACHNIS BREVISCAPA, J. J. Sm.

The two following drawings represent the flower of *Arachnis breviscapa*, J. J. Sm. (*Arachnanthe breviscapa*, J. J. Sm. or

Vandopsis breviscapa, *Schlechter*) an orchid from Sarawak, which flowers in the Botanic Gardens in April. The colour is mustard yellow with umber markings; the lip has umber lines on it and is white at the tip.



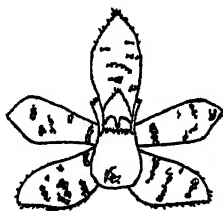
Flower of *Aechmea breviscapa*, in face view and in section, $\times\frac{1}{2}$.

ASCOCHILUS HIRSUTUS, Ridl., var *PORPHYROCHLAMYS*.

A pleasing little orchid has recently flowered in the Botanic Gardens, Singapore, which without doubt is to be assigned to *Sarcochilus hirsutus*, Hook. f. (Fl. Brit. Ind., VI, p. 38, and Ann. Roy. Bot. Garden Calcutta, V, p. 44, pl. 67); but having certain peculiarities not found in the type, it is here described as a variety under the name *porphyrochlamys*. Mr. Ridley (Mat. Fl. Malay Peninsula, Monocotyledons, I, p. 179) transferred *Sarcochilus hirsutus* to the genus *Ascochilus* as *A. hirsutus*.

The plant which flowered in Singapore is of uncertain origin.

Its stems ascend obliquely and the solitary inflorescences arise from the axils of lower leaves about to die, standing nearly horizontally, and bearing the flowers in a corymb facing forwards. This means that the twist upon the ovary and pedicel varies in the different flowers. The flowers produced were up to 10 in number, pleasantly fragrant and lasted about four days. They expanded widely as here drawn.



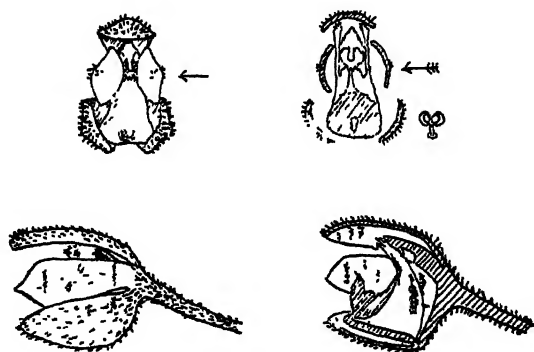
. Expanded flower of *Ascochilus hirsutus*, nat size.

The details of the flower are not exactly as in Sir Joseph Hooker's description and drawings; but then he apologises for his work in the following words "Described from the drawing and a very few detached flowers in a very bad state, contained in an attached pocket. The analysis of the lip of the latter was most

difficult and, though conducted with extreme care, I cannot vouch for its perfect accuracy." According to Sir Joseph Hooker's descriptions, the type and this variety differ in the following points:—

TYPE.	VAR PORPHYROCHLAMYS.
Leaves apparently flaccid and probably drooping	Leaves firm and horizontal on either side of the obliquely ascending stem
Peduncles green suberect	Peduncles purple horizontal
Flowers 2/3 in.	Flowers 1 inch
Dorsal sepal apiculate	Dorsal sepal obtuse
Lip...claw dilating into a cup-like spur:	Lip...claw not dilated into a cup-like spur:
side-lobes or arms of the hypochil wing-like:	side-lobes narrow falcate, even-edged to the toothed apex:
point of spur drawn as elongated.	point of spur very short.

The drawings to which Sir Joseph Hooker referred are those of Kunstler, whose locality is given loosely as "Perak." In the Singapore Herbarium is a drawing of the species made by C. Curtis and localised as from Telok Anson "came with *Phalaenopsis violacea*." It seems that the plant flowered in the Waterfall Gardens. From this source came Mr. Ridley's description in his Materials. The drawing represents the spur at the apex of the labellum as elongated somewhat; and in this respect the plant is as Kunstler's and not as in the var. *porphyrochlamys*. Mr. Curtis represents the hairs on the outside of the flower as reddish purple.



Flower of *Ascochilus hirsutus* expanding.

The same in section; the arrow points to frilled edge of the callus.

Flower of *Ascochilus hirsutus* from the side before expansion.

The same in section.

A NEW ORCHID—*SACCOLABIUM CRUCICALLUS*.

Saccolabium crucicallus is a species brought by Mr. Mahomed Haniff into the Waterfall Garden, Penang, from Pungah in Lower Siam. It belongs to the section Teretifoliae and suggests the Perak *S. Kunstleri*, Ridl., but in flower is manifestly distinct. It suggests also *S. luteifolium*, Ridl. from Lower Siam.

***Saccolabium crucicallus*.** *Planta* epiphytica. *Caulis* elongatus, pensilis, viridi-purpurascens, 5 mm. crassus, internodiis c. 2 cm. longis. *Folia* teretia, ut cauli 5 mm. crassa, aliquo modo recurvata, minopere versus apicem obtusum contracta, viridia vel purpurascens. ad 14 cm. longa. *Racemi* ex caule ad latera foliorum enascentes, a caule basi divergentes deinde deflexi versus terram prorsi, ad 15 cm. longi, 25-flori; axis angulatus: pedicelli cum ovariis horizontales, lutescentes. *Sepala* purpureo-brunnea, obtusissima, 4 mm. longa, 2 mm. lata, dorsale quadrato-ovatum; lateralia oblique quadrato-ovata. *Petala* sepalis concoloria, lincar-acuta, 3 mm. longa, 1 mm. lata explanata. *Labellum* cremeum nisi in lobis basalibus ubi luteum; lobi basales rotundati, omnino inflexi; lobi apicales ovati carnosiusculi ad medium inflexi; lobus medius in parte apicali horizontalis, latissime ovatus, obtusus: calcar ob callo cruciformi in ore fere clausum, intra dorso cristatum, lateribus crassum, mellifer, callo in ramo infimo paullulu hirsuto. *Gynostemium* anguste cithariforme, luteum.

Floret mense Septembris in Horto Botanico Penangensi: habitat in collibus prope Pungah, Siam inferioris, *Mohamed Haniff*.



Flower of *Saccolabium crucicallus*, x 2, and the cross shaped callus still more enlarged. W. is the wall of the spur and the arrow indicates the approach to the honey.

Stems more or less pendulous green, but developing a purplish pigment on the exposed side which confused in the eye with the green looks purplish brown, about 5 mm. thick. Leaves about 2 cm. apart, up to 14 cm. long terete as thick as the stem, recurved slightly, in a very slight degree tapered just below the blunt apex, with a little of the purple pigment in them where exposed. Raceme from the side of the leaf, about 15 cm. long and 25-flowered, directed earthwards except in the first few cm. which carry it out from the stem, angled. Pedicels and ovary (at flowering indistinguishable) about 1 cm. long at right angles to the axis yellowish with a few minute purplish markings.

Sepals purplish brown squarely ovate, except for a very slight obliquity in the lateral sepals all three equal, very blunt 4 mm.

long by 2 mm. wide. Lateral petals of the same colour as the sepals linear acute 3 mm. long by 1 mm. wide, standing in the same plane as the sepals i.e. at right angle to the ovary. Labellum cream-coloured with bright yellow on the lower of the two pairs of lateral lobes, with a blunt spur 2 mm. long and very faintly bilobed this spur nearly parallel to the ovary and so horizontal. Side lobes bifid, the upper of the two divisions thin circular bent in over the entrances to the spur: the lower of the two pairs ovate slightly fleshy and at first directed forward, but then equally bent in: the mid lobe directed forward very broadly ovate oblate obtuse: interior of the spur with from above a cross-shaped callus hollowed between the points and just hairy upon the lowest point, and from below a curved ridge which impinges upon the back of the callus, while the wall of the spur thickened at either side (W in figure) closes any approach to the honey under the callus. The approach to the abundant honey is thus over the lateral arms of the cross and therefore above the lateral lobes of the lip. An arrow indicates it.

Column yellow slightly fiddleshaped presenting a very slightly hollowed face forwards.

I. H. BURKILL.

HAPLOCHOREMA SUMATRANUM.

The late Dr. Karl Schumann defined in 1899 a genus *Haplochorema*, with then four species from Borneo, to which he added two more from the same island in 1900. He remarked that its affinity was close with *Kaempferia*, but that by having an unicellular ovary, it appeared sharply distinguished from this and from all other genera of the Zingiberaceae to which it belongs. If the character drawn from the ovary holds good then a Sumatran plant now in cultivation in the Botanic Gardens, Singapore, is also a *Haplochorema*: but it suggests *Gastrochilus* more than *Kaempferia*. The ovary of all the species in these three genera should be examined afresh to decide how they differ and are to be distinguished.

Dr. T. Valetton has already questioned the soundness of Karl Schumann's judgment in regard to an unicellular ovary in a few Zingiberaceae marking them off as a genus, and in the *Bulletin du Jardin Botanique de Buitenzorg*, series 2, No. 21, 1918, p. 115, has reminded us that *Curcuma Kunstleri*, Baker, may possess one as an abnormality.

The following is a description of this new *Haplochorema*.

Haplochorema sumatranum. *Herba* pedalis et ultra, sylvicola. *Rhizoma* breve. *Folia* disticha, 2—4 supra vaginas duas: petiolus ad 12 cm. longus, in dimidio inferiore vaginatus, vaginorum apicibus lanceolatis mox emortuis: lamina late elliptica, apice et basi acuta, araneoso-hirsuta, ad 30 cm. longa, ad 15 cm. lata. *Racemus* 3—5-florus: flores invicem exserti singuli, bracteis

transparentibus cincti, apicibus bractearum brunneo-lineatis. *Se-pala* albotransparentia, 1.5 cm. longa. *Corollae* tubus 6—7 cm. longus, albus; petala acuta, inaequalia; dorsale majus anguste triangulari-ovatum, 1.2 cm. longum; lateralia triangulari-lanceolata, 1.1 cm. longa. *Labellum* 1.5 cm., 0.8 cm. latum, basi album, vix bilobatum sed subrotundatum, apice luteum, in medio linea scalariformi notatum. *Staminodia* alba, 1 cm. longa, obovata, apice rotundata. *Staminis* connectivum crista luteo-tincta, dentibus 2—4 parvis latis coronatum; anthera apices deflexi, granas pollinis extendantes. *Orarium* 6—8-ovulatum; ovula ex basi orta; stigmatis os despicens.

Habitat in sylvis montis Bukit kramat kuda, prope Sino-langit, in Sumatra: collegit Mohamed Nar sub numero 258. Colitur in Horto botanico Singapore.

The flowers of this small herb are not conspicuous; they are produced one at a time close to the ground under the leaves, the bases of the lamina of which they scarcely attain. The raceme is not distichous as are the leaves, but shows an arrangement in three stichies. The ovary is sessile among the transparent bracts, and possesses upwards of eight ascending ovules in its single cavity. The corolla-tube is very long and slender, reaching 7 cm., white, and of the same thickness throughout. The petals are not quite equal, the upper which is inclined to arch over being largest while the other two which lie close together are quite behind the labellum. The labellum is large, and only just bifid at the very tip; in the basal half it is white with a brown ladder-like double stripe down the mid-line not extending into the throat, and in the apical portion it is chrome yellow. The staminodes are white. The connective is bent upon the filament at an angle of 45 degrees; it is crested above by reason of four small teeth.

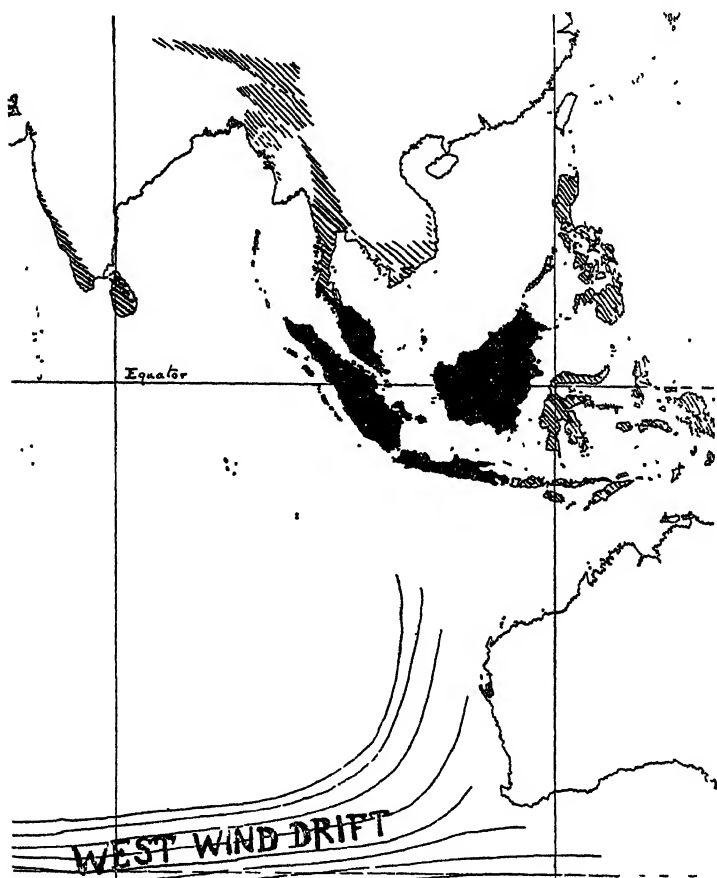
I. H. BURKILL.

A BOTANICAL RECONNAISSANCE UPON THE MAIN RANGE OF THE PENINSULA AT FRASER HILL.

These pages are written under the belief that the following more or less accurately represents the history of the warmth and moisture loving flora of the Malay Archipelago from the Miocene period.

In the Miocene there was a time, or there were times, when very humid conditions prevailed right from the westernmost limits of the Indian Ocean to the Pacific. So long as they prevailed it was possible for plants which can only exist under such conditions, namely the components of a tropical rain forest, to spread through the lands between Africa and the neighbourhood of say New Guinea. But there intruded into this warm and moist climate

drier conditions spreading from the west, which on reaching the Arabian Sea cut off that part of the tropical rain forest flora which is now left in the Mascarene Islands, and on reaching the bay of



Map showing present position of the west wind drift and cold ocean current, causing dry climate in Western Australia. Western Malaysia is shown black, and other areas of tropical rain forest shaded.

Bengal cut off the tropical rain forest flora of Ceylon and South India; and then impinged upon a rain forest belt extending from Malaysia northwards to the region of the eastern Himalaya, but never so strongly as to break it down. From the dates of the stages of the eastward advance of dry conditions the three rain forest floras, (1) of Mascarenia, (2) of Ceylon and South India, (3) of Malaysia, with Burma, etc. remained isolated, and evolved independently. About the period when the extension of the dry conditions had become complete, it appears probable that the cold West-wind drift (vide map), which surrenders so little moisture

to the winds that blow upon Western Australia, reached the outer shores of Malaysia more distinctly than it does now, and rendered dry their face towards the Indian Ocean in a measure sufficient for an extension of certain dry-climate plants to Australia. During this extension, the rain forest flora would be at bay in the centre of the archipelago. But a recovery from this extreme soon coming, the rain forest flora spread back to the shores of the Indian Ocean, first reaching it where the west wind drift would be weakest, that is to say along the shores of Sumatra, and subsequently following the retreat of the cold current eastward into Java, and onward.

Within the Archipelago complicated orographic changes helped or hindered in various ways the recovery by the tropical rain forest of mastery; and it is for the present generation of naturalists to gather together the geographic and geologic details, which alone can lead to an understanding of the course of events. Much has been written, all of it subject still to criticism, and especially because most of the writers have neglected the possibility of climatic changes, in their effort to explain the peculiarities of the dispersal of living things by land changes: but this is certain, that at present what is here defined as Western Malaysia (see the map) holds the most intense rain forest flora of the old world—a flora which on that account must be considered to have had the least chequered history. It has produced in itself, in a greater measure than any other Old World flora, forests of lofty trees, with an abundance of epiphytes and a wealth of ground plants physiologically fitted to exist in deep and moist shade; and therefore has great claims on the attention of naturalists, because it demonstrates that there has been a nucleus of constant climate within the Malay Archipelago, though not by any means of necessity throughout it.

More than twenty years ago, Dr. O. Stapf called attention to the appearance that Borneo holds as it were a nucleus of the peculiar Malaysian flora. This would happen as a consequence of Borneo holding its least interrupted developments and is understandable upon the theory that the outer shores of the Archipelago were once dried by the greater volume of cold water in that northward branch of the west wind drift current which still affects south-eastern Malaysia somewhat.

There are good reasons for thinking that the cold of the Glacial period did not alter the temperatures of the Equator, though greatly compressing the warm temperate and subtropical belts of the globe. The seas of the Tropics fell, in consequence of the great volumes of water withdrawn and converted into ice caps at the poles, which ice caps again acting through gravity further lowered tropical sea-levels, a condition adding island to island in a region such as Malaysia where the seas are shallow.*

*The increase of land area in arctic and probably also in antarctic regions during the glacial period would, however, most probably have tended to a decrease of land area in the tropics, this effect counteracting that of the accumulation of ice at the poles (see C. E. P. Brooks, "*Evolution of Climate*", 1922.)

These land unions may be considered as furthering the spread of the rain forest flora after the dry conditions of the outer coast had given way.

In the mountains of southern India and of Ceylon herbs occur of northern genera, and undoubtedly of northern origin. It is possible to believe that the Glacial period gave to most of those in southern India the opportunity which brought them where they are: but as regards those in Ceylon the view which is most acceptable is one which would allow them to have reached the peaks of that island as other plants have undoubtedly reached Oceanic islands, namely by the success now and then of a random shot. And the same supposition is at present the most tenable one for the explanation of the existence of a few truly northern genera (all herbs) upon the mountains of Malaysia. We believe then in a very long continuation of warm and moist conditions within the Malay Archipelago, unbroken over part of it, and that part central, but probably broken at one time on the periphery.

Holding that view, and finding it possible to put a part of it to a test in paying a short visit to some part of the Malay Peninsula we selected for our work the new hill-station of Fraser Hill in Lat. $3^{\circ} 42' N.$ Long. $101^{\circ} 44' E.$ We spent at it the second half of September, 1922, attempting to study the vegetation in the broadest way: and we collected all groups of plants. We were helped in this by Mr. G. S. Neal of the Forest Service, who, with two Malays, was sent most kindly by that Department to assist us. One of us (I.H.B.) has determined the collection of Seed-plants, the other (R.E.H.) has determined the ferns, and is responsible for the naming of the plants of lower position through specialists. We do not in this report enumerate anything below the mosses: but as Mr. H. N. Dixon has most kindly sent his determinations of them, they and their distribution are included. Mr. Ridley's Flora of the Malay Peninsula arrived in the Colony too late for use in the preparation of this report.

We selected Fraser Hill for our work because new roads and paths have made the forest particularly accessible, a new map has fixed the altitudes accurately, and not a little felling has brought the top of the forest within the possibility of investigation. It obviously promised more rapid results than any other place that was open to us.

Fraser Hill occupies the very summit of the Main Range on the Selangor-Pahang boundary. It is not virgin ground, which indeed was an advantage to us, for Mr. C. C. Curtis collected in the neighbourhood, and Mr. H. N. Ridley subsequently visited it twice: the Hon. Mr. C. Hose, Mrs. Ferguson-Davie and Mr. G. E. S. Cuthitt also had collected a few plants there between 1919 and our visit; and Mrs. Smith of Bangkok collected ferns in June 1922. Mr. Ridley has described the new species which he got at Fraser Hill as from Sempang mines. These mines, existing as mines no longer, were under a hill whereon a Mr. Fraser built himself a

house, and the hill was called Bukit Fraser. When it was decided to develop a hill-station around this house, several other hill-tops being taken into the area, the name Bukit Fraser or Fraser's hill became no longer accurately descriptive: and we have followed the Ordnance Survey's map by calling it instead "Fraser Hill" as if an English township: by this name we mean all the land above 1,000 ft. which has been allotted for development as circumstances permit into a residential place.

The ridges may be described as three, called the North ridge, the South ridge and the Reservoir ridge, the second and the third being parts of the waterparting 4,289 and 4,370 ft. high respectively: the remaining one is entirely on the Pahang side of the division, and reaches 4,286 ft. while South summits on the same side of the waterparting reaches 1,360 ft. A line of vein-quartz extends under parts of the second and third, and while responsible for the resistance to aerial denudation which has made the two ridges, is also responsible for a change in the flora marked enough to carry peculiar species. There is vein-quartz elsewhere, but not so much in evidence, and under the upper end of North ridge appears a thin wall of quartzite.

About Fraser Hill the crests of the Main range are twisted out of the approximate north-and-south line of the range to be nearly east-and-west. That is how Fraser Hill possesses a "north ridge" entirely in Pahang. Westward from Reservoir ridge reaching 1,370 ft., with many serrations, the range attains 4,800 ft. in Pine-tree hill (so misnamed from the *Dacrydium* upon it) and bending a little north successively there is the Gunung Semangkok of the maps (5,600 ft.) and the twin peaks of G. Ulu Liang (6,335 and 6,360 ft.) In the other direction the range falls to the Semangkok pass, where the Gap resthouse is situated at 2,790 ft., and rises very abruptly to a Trigonometrical station at 3,883 ft.,* (which appears to be the "G. Semangkok" of Mr. Ridley in his descriptions of plants) and with serrations to G. Ulu Semangkok (1,576 ft.), south of which is G. Ulu Kali (5,812 ft.), and then comes G. Mengkuang lebar, collected over by Mr. H. C. Robinson, the land falling to the Ginting Sempah pass.

We visited Pine-tree hill and a spot a couple of miles short of the Trigonometrical Survey's post on G. Ulu Semangkok.

The drainage from a large part of Fraser Hill runs down a valley toward Tras,—the Tras stream,—and from the immediate neighbourhood of Fraser's house this valley has been much mined for tin. We descended it to 3,300 ft.

It will be found quite clear in the following pages whether we collected the plants we name beyond the limits of Fraser Hill towards Pine-tree hill, or below the 4,000 ft. contour line either

*For some of the unpublished altitudes we record our best thanks to Mr. V. A. Lowinger, the Surveyor General.

towards the Gap or in the upper Tras valley or south-east of the Gap towards G. Ulu Semangkok: and we count no locality below 4,000 ft. as Fraser Hill.

The normal vegetation of Fraser Hill is forest and this we shall describe. A second form of vegetation is that which the steep hill sides, by reason of landslides, maintain: places in the sun being thus afforded to plants of small growth. Man by mining has destroyed the forest not a little, and into the bared places, the landslide vegetation is able to step; but in the wake of man follow many plants which would not seem to be part of the landslide flora: and the mining has been of long enough duration to have given them a good hold. The making of roads of course has exactly the same effect as the mining. These three elements, then, we distinguish on the face of the land,—the forest, on the one hand, and upon the other the landslide plants with the followers of man.

There have been periods in the history of the every part of the globe, when mountain-building was more active in it than now; and these would be periods of steeper slopes and numerous repeated landslides (yet the hill-sides of the Malay Peninsula are still very steep); and in such periods there would be a great opportunity for the development of species suited to such a peculiar condition. We are bound to believe that it has occurred; *Calanthe aurea*, *Rubus rosaeifolius*, *Litsea citrata*, *Homalanthus populneus* are plants holding their places in the hills by landslides. *Pteridium aquilinum*, *Histiopteris incisa*, *Dipteris conjugata*, *Hypolepis tenuifolia* and probably the *Gleichenias* are ferns belonging to this group of plants.

The miners of Fraser Hill formerly had but narrow steep paths for their traffic: but now the station is reached by bullock carts and upon the roads one sees the process of introduction of weeds through bullock droppings: thus the droppings lying upon the bare roads carry grasses, notably *Eleusine indica* and in the second degree *Fimbristylis diphylla*. By their absence away from the droppings it is to be concluded that casual seeds of these upon bare landslide surfaces would have but a poor chance of survival.

The forest of the Main range in the Semangkok pass we consider changes at about 3,300 ft. There the *Dipterocarps* disappear and the depth of the vegetation is reduced from 200 ft. to 100 ft. Close to the elevation at which the *Dipterocarps* vanish, *Aranga* disappears, and *Pandanus* also. Upon the ridges above 4,000 ft. the big trees are about 100 ft. high. We roughly measured eighty-two on the North, South and Reservoir ridges, as given in the following table, taping the bole at breast height, but judging the other dimensions by eye with the help of a rod laid against the lower part of the bole. We measured all trees in the selected places that appeared to be upwards of five feet in girth, our Malay assistants naming them: and we consider that we obtained the height of the forest in this way with a fair measure of accuracy. All measurements are expressed in feet.

TABLE I.

The Size of Trees at Fraser Hill.

Maly name and probable genus	No of trees	limit of girth	limit of bo c	limit of total height	limit of spread of longest branch
Kadondong (<i>Canarium</i>)	31	4.5-11.5	35-75	65-105	15-40
Nyatoh (<i>Pagena</i>)	11	4.5-13	25-65	65-100	15-20
Mempuning (<i>Quercus</i>)	7	4.5-8	45-70	75-100	15-30
Kelat (<i>Eugenia</i>)	9	4.5-6.5	35-70	60-90	15-30
Rengas (<i>Gluta</i>)	5	5-10	40-60	80-100	15-25
Bintangor (<i>Calophyllum</i>)	2	5-6	65-70	85-90	20
Meragu	2	4-8	40-45	75-85	20-30
Medang (? <i>Phoebe</i>)	2	1.5-5	55-65	80-85	15-20
Penaga betul (<i>Calophyllum</i>)	1	8	55	85	30
Samok (<i>Eugenia</i>)	1	6.5	40	65	40
Ludai	1	6	20	85	20
Kadondong mata-lari (? <i>Trigonochlamys</i>)	1	5.5	25	70	20
Plangi	1	5.5	60	95	20
Kulim burong	1	5.5	60	85	25
Kayu kuning	1	5.5	60	80	20
Tampoi (? <i>Baccaurea</i>)	1	5	45	85	30
Kumala	1	1.5	60	90	35
Pelit	1	4.5	55	70	15
Pulangdaing	1	4.5	30	80	20
Kunkur	1	3.5	70	80	10
Putat (<i>Barringtonia</i>)	1	3.5	60	80	20

It is a very noteworthy fact that the big trees are upon the tops of the ridges; down their slopes, while there are more trees

to the acre than above, on the average they are smaller. Though not quite certain of the cause of this, we believe that it is a consequence of horizontal light passing under the crowns and making the conditions easier for the lesser growth, which so favoured in the air handicaps in the soil the competitors which might become of larger growth.

From the eighty to one-hundred feet high forest of Fraser Hill, if we ascend, as we do in the direction of Pine-tree hill, we get into forest fifty feet high, and then into forest twenty-feet high. Doubtless on G. Ulu Liang at the height of a further thousand feet, this reduction in depth would bring us to the real Elfin forest of our highest mountains: but we did not approach it at all. The vegetation of the summit of Pine-tree hill is of trees of *Dacrydium Beccarii* about twenty feet high, and of *Rhododendrons* and *Vacciniums* not taller.

Before passing on from the matter of the depth of the forest, it may be said that by means of Negretti and Zambra's dendrometer we measured some of the lofty trees at 3,300 ft. and below and found a lofty *Shorea* with a hole of 17 ft. in girth to reach 200 ft.

The tall forest, of course, holds more than one height of tree. On slopes it is not layered, but on the tops of the ridges the big trees with crowns 20-40 feet across (see the table above) shut-out light enough to make it necessary for light-diffusion spaces to exist, whereunder a new layer of foliage can develop. The forest that is 50 feet high exhibits no layers.

About Fraser Hill there is no mossy forest: it is necessary to ascend higher for it. One of us spent a week in May, 1922, on G. Gedeh in Java at 4,500 feet, finding the climate there, height for height, colder and the forest more mossy. It is very probable that the air currents which sweep down the sides of G. Gedeh from anything up to 9,000 feet account for this; and there are no heights over Fraser Hill to supply cold down-draughts. The higher mountains further north were frequently observed to be covered with cloud when Fraser Hill was free from it (G. Ulu Liang is reputed to be very wet) and this more constant saturation of the atmosphere is no doubt necessary for the maintenance of mossy forest. However, the more one ascends from the height of Fraser Hill in the direction of Pine-tree hill, the more mossy becomes the forest and the deeper the layer of raw spongy humus upon it, until the latter is eighteen inches thick. In this mossy layer *Calanthe angustifolia*, *Burmannia longifolia*, *Sonerila rudis*, *S. velutina*, *Argostemma Yappii* find themselves particularly at home.

Pine-tree hill is about 4,800 feet high. It is evident that a flora of another type replaces the typical Fraser Hill forest there, and this one observation suggests that the type of vegetation which we have said commenced about 3,300 feet, gives way about 4,800

feet. The conclusion wants confirmation. In this replacing vegetation, because the trees are of lesser size than at lower levels, except for the interference of cloud, more sunlight is able to reach the ground. The vegetation which uses this sunlight is only in a small measure of phanerogamic herbs, apparently because of the acidity of the mossy raw humus on the surface of the soil.

There is no light-diffusion space in the mossy forest, and the small trees are very crowded. Upon the tops of the ridges of Fraser Hill there is however a somewhat imperfect light-diffusion space with the branches of the trees above it and with small to four feet high plants below it such as: *Polygala venenosa*, *Pterisanthes pulchra*, *Blastus cogniauxii*, *Sonerila radis*, *S. albiflora*, *S. integrifolia*, *Phyllagathis hispida*, *Begonia tricornis*, *Begonia* sp., *Argostemma Yappii*, *A. urticaeepolium*, *A. spinulosum*, *A. involucreatum*, *Gardenia pulchella*, *Chasalia rostrata*, *C. lurida*, *Cephaelis* 2 spp., *Pentaphragma Scortechinii*, *Labisia pumila*, *L. longistyla*, *Ardisia Maingayi*, *Didymocarpus flavesceus*, *D. hirta*, *D. malayana*, *D. plutypus*, *D. quinquevulnera*, *D. crinita*, *D. venusta*, *D. pumila*, *Strobilanthes hirtisepalus*, *Filetia hirta*, *P. paniculata*, *Justicia subalternans*, *Gomphostemma* sp., *Piper stylosum*, *P. semangkanum*, *C. brachystachys*, *Balanophora multibracteata*, *Burmannia longifolia*, *Liparis* sp., *Calanthe angustifolia*, *Anoectochilus Reinwardtii*, *Anoectochilus* sp., *Cryptostylis arachnites*, *Globba aurantiaca*, *G. cernua*, *Camptandra ovata*, *Zingiber spectabile*, *Zingiber gracile*, *Zingiber Griffithii*, *Alpinia petiolata*, *Geostachys secunda*, *Cureuligo latifolia*, *Tacca cristata*, *Pinanga polymorpha*, *Pinanga paradoxa*, *Licuala pusilla*, *Forrestia gracilis*, *Arisaema Scortechinii*, *Amorphophallus* sp., *A. Lowii*, *Lepthatherum gracile*, *Lindsaya orbiculata*, *L. decomposita*, *Trichomanes rigida*, *T. pluma*, *Diplazium bantamense*, *D. sylvaticum*, *D. tomentosum*, *D. fraxinifolium*, *Asplenium tenerum*, *Dryopteris crassifolia*, *D. calcarata*, *D. parasitica*, *Phegopteris laserpitiiifolia*, *Taenitis blechnoides*, *Cheiropleuria bicuspis*, *Selaginella atroviridis*, *S. Wallichii*.

Equally under dense shade, but requiring running water, or an unusual amount of it, with good soil, are: *Impatiens oncidoides*, *Ophiorrhiza erubescens*, *Cyrtandra pilosa*, *Phaius callosus*, *Alocasia Baccarii* and *Schismatoglottis* sp.

This assemblage of small plants contains a very large percentage of seed-plants with a restricted distribution. Of the 70, 44 or 63 per cent, are confined to the Malay Peninsula and a further 13, making in all 57, or 84 per cent, do not pass out of what is here called western Malaysia. This is a greater percentage of endemism than in the overshadowing trees and shrubs, but not greater than among epiphytes, nor among giant herbs.

The overshadowing trees and shrubs number 1405 and of them 60, or 57 per cent, are confined to the Malay Peninsula, and another 26, making in all 83, or 82 per cent, do not extend beyond western Malaysia.

The climbers which climb these forest trees are 28 in number, and of them 12, or 43 per cent, are endemic, while a further 10, or 22 in all, making 79 per cent, do not pass beyond western Malaysia. The figures will be found in Table II.

The wide-spread seed-plants of the forest-floor flora are: *Chasalia lurida*, *Chloranthus brachystachys*, *Cryptostylis arachnites*, *Panicum indicum* and *Lephaltherum gracile*,—plants which do what no epiphyte does, namely spread from Ceylon to Malaysia, but with a broken distribution in almost every case.

The following are the Fraser Hill species which have an extension from western Malaysia into eastern Malaysia in varying degrees, without extending into Australia nor into the Pacific:

(forestal species)

Anoetochilus Reinwardtii reaches Amboina; *Memecylon myrsinoides* reaches Celebes; *Polygala venenosa*, *Xanthophyllum excelsum*, *Urophyllum glabrum*, *Quercus cyrtorrhyncha*, *Engelhardtia spicata*, *Dacrydium fulciforme*, *Liparis compressa*, and *Eria major* reach the Philippines; and *Burmanna longifolia* reaches New Guinea;

(species of the open)

Joinvillea borneensis reaches Palawan only, and *Spathoglottis aurea* reaches Celebes. *Spathoglottis plicata* and *Gunnia javanica* from western Malaysia reach Samoa and Fiji respectively.

The following species occur in Tenasserim or the Andamans and thence south and east into Malaysia but in no case through it to Australia, nor into the Pacific:

(forestal plants)

Limacia triandra, *Leptonychia heteroclita*, *Schima Noronhai*, *Adinandra dumosa*, *Vitis mollissima*, *Arthrophyllum diversifolium*, *Rhodamnia trinervia*, *Elytranthe formosa*, *Eria floribunda*, *Curculigo latifolia*, *Tacca cristata* and *Anadendron montanum*.

(plants of the open)

Elaeocarpus gambir, *Daphne composita* and *Glochidion coronatum*.

There are a few interesting plants with a distribution in the direction of Indo-China and China. They are (1) reaching Indo-China *Illicium cambodianum*, *Labisia pumila*, and *Dacrydium elatum*; and (2) reaching China, *Tynura bicolor* and *Smilax laevis*.

The following have an extension of range northward to the eastern Himalaya: (all forestal, except *Jussieuia*, *Pratia* and *Blumea*) *Jussieuia fissendrocarpa*, *Randia racemosa*, *Ophiorrhiza erubescens*, *Blumea balsamifera*, *Pratia begonifolia*, *Ardisia colorata*, *Loranthus pentapetalus*, *L. coccineus*, *Elytranthe globosa*, *Conocephalus suaveolens*, *Ficus rostrata*, *Podocarpus neriifolius*. Out of these *Randia* extends to Australia, the *Podocarpus* to New Guinea; *Loranthus pentapetalus* and *Conocephalus suaveolens* to the Philippine Islands; the others not passing beyond western Malaysia in an eastward direction.

The following occur in Ceylon or Southern India and two reach the Seychelle islands:—

(forestal)

Melastoma malabathricum, *Eugenia zeylanica*, *Psychotria sarmentosa*, *Chasalia lurida*, *Vernonia arborea*, *Gaertnera Koenigii*, *Uncaria dasycneura*, *Chloranthus brachystachys*, *Cryptostylis arachnites*, *Panicum indicum*, *Lophatherum gracile*

(of open places)

Vitis trifolia, *Pithecolobium angulatum*, *Drymaria cordata*, *Rubus rosaeifolius*, *Trichosanthes bracteescens*, *Embelia*, *Ribes*, *Polygonum chinense*, *Litsea citrata*, *Homalanthus populneus* (doubtful), *Trema orientalis*.

Of these two reach Australia, four eastern Malaysia, and the other two do not pass beyond western Malaysia.

Of the ferns nearly 50% reach Ceylon and nearly 20% reach the Mascarenes.

There remain 19 pantropic plants and everyone of them is a plant of the open. All of them are foreign to the flora of Fraser Hill, being intruders following man: and it will scarcely be necessary in this place to name them. Fourteen ferns are pantropical, six of these being plants of the open.

It is convenient to name here, before passing on, the few plants which we found above Fraser Hill and not at it: they are, *Polyalthia pulchra* which is endemic, an *Eugenia* which appears to be endemic, *Sonerila tenuifolia*, which occurs in Sumatra, Java and Borneo, *S. retutina*, *Webera salicina* and *Pentaptergygium Scottchinii*, all three being endemic, *Diplycosia latifolia* which occurs in Sumatra, a *Diplycosia* and *Dischidia albidia*, which are endemic, an *Antidesma* unmatched and possibly endemic, *Dacrydium Beccarii* which occurs in Borneo and in Mindoro, and lastly *Agrostophyllum bicuspidatum*, an orchid whose absence at Fraser Hill is improbable as it occurs from Tenasserim through the Peninsula to Java and to Celebes. Eight out of twelve are endemic species. Three of them are genuine xerophytes, i.e. *Dacrydium Beccarii* and the two species of *Diplycosia*.

The next statement gives the distribution, as known, of those species which are confined to western Malaysia, but not endemic in the Peninsula:—

reaching Lingga only, 1 species,
 reaching Banca only, 1 species,
 reaching Sumatra only, 13 species,
 reaching Borneo only, 11 species,
 reaching Java only, 7 species,
 reaching Java and Sumatra, 8 species,
 reaching Borneo and Sumatra, 11 species,
 reaching Borneo and Java, 5 species.
 reaching Sumatra, Java and Borneo, 14 species;

this makes 46 as common to the Peninsula and Sumatra, 36 as common to the Peninsula and Borneo; and 34 common to the

Peninsula and Java: but it is certain that as Sumatra and Borneo become better known the number of plants common to either of them and to the Peninsula, will increase and greatly out-distance the number that are common to Java and the Peninsula.

TABLE II.
Distribution of Species.

	Confined within the Peninsula.	Extending to Islands of Western Malaysia.	Extending to the Pacific.	Extending to Tenasserim and the Pacific.	Extending to the Himalaya, China and the Pacific.	Extending to Ceylon or Mascareenia and the Pacific.	Without bounds in the tropics.	TOTAL.
Forest Plants.								
1. <i>Numbers of species</i>								
Shading trees and shrubs	60	26	6	5	1	1	..	105
Climbers	12	10	..	2	2	2	..	28
Overhead parasites	2	2	..	1	3	..	..	8
Epiphytes	36	17	1	2	..	..	..	56
Giant herbs	2	1	..	..	..	..	..	3
Plants of the forest floor	14	13	4	2	2	5	..	40
Ground ferns	2	4	4	..	7	12	3	32
Epiphytic ferns	3	1	14	..	5	17	5	48
2. <i>Percentages</i>								
Shading trees and shrubs	57	25	6	5	1	1	..	..
Climbers	43	36	..	7	7	7	..	..
Overhead parasites	25	25	..	13	37	..	..	..
Epiphytes	64	30	2	1	..	..	..	..
Giant herbs	67	33	..	..	..	..	..	..
Plants of the forest floor	63	18	6	3	3	7	..	..
Ground ferns	6	13	12	..	22	38	9	..
Epiphytic ferns	6	9	29	..	10	36	10	..
Plants of the Open.								
Trees and shrubs	2	3	..	3	1	3	..	12
Climbers	1	3	..	..	..	4	..	8
Herbs	1	..	4	2	4	1	19	31
Ferns	2	..	..	..	2	3	6	13

In the notes below some trouble has been taken to show how species montane in the north of the Peninsula descend more or less to sea level in the south. This we attribute to the distinct intercalation of a dry period in the north, and its disappearance, all but complete, southwards.

Of the plants which extend from the Peninsula into other parts of western Malaysia, without going further, two thirds descend to low levels. On the other hand very few of the Fraser Hill species which are endemic in the Peninsula descend to low levels. It is as if to have been able to pass between the Peninsula and other parts of western Malaysia, the forestal species with which we are dealing had to possess the ability to live in a climate as of Johore and Singapore at sea level.

A land connection between the Peninsula and Sumatra and another between the Peninsula and Borneo, in past ages, are admitted generally to have existed. It would seem right in general to believe that those land connections, at any rate on the last occasion of their existence, were low, having at the same time the climate of the south of the Peninsula; it is not necessary to place them as geologically remote, and it is possible to believe that while they (or the last of them if they were repeated) existed, our possibly already considerably evolved montane forestal flora retained its isolation in our mountains undisturbed, evolving locally its endemic species.

It is easiest to believe that the dry climate flora which seems to have passed down the coasts toward the Indian Ocean, did so earlier, and that the spread of these moisture loving plants into Java from Sumatra was subsequent.

Mention has been made of the occurrence of quartz in veins about Fraser Hill. This rock by its very slow decomposition makes the poorest of soils: and the vegetation on them is characteristic. In the first place *Dacrydium falcatum* is a most abundant tree. Its chief associates are *Eugenia*s, one of which is *E. zeylanica*. Other trees which were found with it upon this soil are:—

Illicium cambodianum, a curious *Anonacea*, *Weinmannia Blumei*, *Pygeum ovalifolium*, *Timonius* sp. *Lindera Wrayii*, *Blauocarpus paniculatus*, *E. apiculatus*, *E. reticulatus*, *Vaccinium bancanum*, *Rhodamnia uniflora*, *Cinnamomum aureofulvum* and *C. rhynchophyllum*, *Erodia pachyphylla*, *Ner* sp. *Melastoma malabathricum*, var. *perakense*, *Ardisia chrysophyllifolia* and *A. retinervia*, *Eugenia oreophila*, *Arthropanax pinnatum*, *Memecylon myrsinoides*, *Anorincleistus grandiflora*, *Wikstroemia Candolleana*, *Litsea* sp. *Rubus glomeratus*, *Vitis trifolia*, *Gynochthodes sublancheolata*, *Gaertnera Koenigii*, *Chasalia curviflora*, *Psychotria sarmentosa*, *Uncaria dasyneura*, *Dioscorea laurifolia*, *Smilax laevis*, *Nepenthes sanguinea*, *Alyria pumila*, *Pterisanthes pulchra*, *Scindapsus Scortechinii*, *Cyrtandromaea megaphylla*, *Argostemma Yappii*, *Didymocarpus hirta* D. *pumila*, *Pteridium aquilinum*, *Ceropteris calomelanos*, *Alsophila kingii*, *Hypolepis tenuifolia*, *Histiopteris incisa*.

Of the seed plants in this list 24 are endemic; 10 reach other parts of Western Malaysia; two pass just outside, one to Celebes the other to Mindore; and the rest are much more widespread; *Melastoma malabathricum* reaching the Seychelles, *Engenia zeylanica*, *Uncaria dasycarpa*, *Psychotria sarmentosa*, *Chasalia lurida*, and *Gaertnera Koenigii* reaching Ceylon, *Vitis trifolia* reaching Himalaya, *Similar laevis* reaching China, and *Illicium cambodianum* reaching French Indo-China.

The percentage of endemism is about 55 or not different from that found in the forest of Fraser Hill taken as a whole.

SUMMARY. When a traveller ascends from the Semangkok pass to Fraser Hill, he passes at about 3300 feet out of a very lofty forest into one of lesser growth—its tall trees being 80-100 feet high at Fraser Hill. At a little distance from Fraser Hill where the range runs higher, about say 1100 feet, another type of forest appears, being of lesser growth and more mossy. The forest which we have studied especially is a part of that between 3300 and 1700 feet, namely that at Fraser Hill itself between 1000 and 1370 feet. Of its woody shading plants 57% are confined to the Peninsula, of its epiphytes 64% and of its ground vegetation (seed plants) 63%. These are high percentages, and indicate a considerable isolation of the mountains of the Peninsula. The species of the forest which are not endemic exist for the most part as lowland plants in the south of the Peninsula: by doing which they suggest that when the Peninsula was joined by land to Sumatra or to Borneo the land bridge was in climate and want of elevation as Johore and Singapore. It is clear that the montane species did not cross it. These montane species were evolved locally from typically Malaysian genera, and do not declare themselves immigrants evolved elsewhere. All their genera except *Daphne*, *Geostachys*, and *Nenga* are known from Borneo and all except *Leptorrhyncha*, *Blastus*, *Anerincleistus*, *Phyllagathis*, *Filizia*, *Daerydium*, *Agathis* (introduced however) *Camplandra*, *Geostachys* and *Joinvillea* are known from Java; whereas as many as 60 of the genera are absent from Ceylon.

We recognise as present another flora—the flora that requires open ground. It is small and of mixed origin, for there are in it species whose genesis would seem to be upon ground bared by landslides, and there are intruders following man. The flora is rather small for analysis though very interesting.

PART II.

Enumeration of the Seed-Plants, Ferns and Mosses Collected.

In this enumeration the literature cited is the last only which sums up in any way the distribution of the plants in various parts of Western Malaysia.

Abbreviations: G.=Gunong or mountain: P.=Pulau or island (s.n.)=specimen sine numero, an unnumbered specimen: and of Works quoted:—

King, Sir George. Materials for a Flora of the Malay Peninsula in the Journal of the Asiatic Society of Bengal vols. 48 to 75, continued by Mr. J. S. Gamble, with the assistance of Sir David Prain, Dr. O. Stapf, Mr. H. N. Ridley, M. G. deCandolle, Prof. J. M. Macfarlane, quoted as King, Mat., Prain, Mat., etc.

Ridley, H. N., Materials for a Flora of the Malay Peninsula Monocotyledons, Singapore, 1908, 3 vols. quoted as Ridley, Mat. Monoc.

Koorders, Excursions-flora von Java, 3 vols. quoted as Koorders.

Smith, J. J., Orchideen von Java, Leiden 1905, quoted as Smith, J. J.

Merrill E. D., A bibliographic enumeration of Bornean plants in the Journal of the Straits branch of the Royal Asiatic Society, special no., 1921, quoted as Merrill.

Ames, O., in the last named, quoted as Ames.

WINTERACEAE.

Illicium cambodianum, Hance: King, Mat., 58, pt. 2, 374. A small tree distributed within the Peninsula and in Indo-China: within the Peninsula it is montane occurring on Kedah peak, on the Taiping hills, on G. Tahan, and down the tops of the Main range from the mountains of Telom to G. Mengkuang Lebar; on Benom; then on Mt. Ophir. It is common about Fraser Hill particularly upon vein-quartz ridges. The claret flowers smell of anise: they are produced both on the old wood and on the ends of branches and turn down. The stigmas overtop the anthers by a little and spread into a ring as the fruit forms. The Malays call the tree Bakau bukit or hill mangrove, because its red wood suggests mangrove wood.

MAGNOLIACEAE.

Talauma Candollei, Blume; Koorders, 2, p. 240: Merrill p. 251: *T. mutabilis*, Blume. King, Mat., 58, pt. 2, p. 373. A shrub very variable in its different varieties, distributed from Sumatra and from Pungah in Lower Siam through the Peninsula to West Java and North Borneo. In the Peninsula it occurs on Kedah peak, in Penang and on the Main range from the mountains of Telom to the Semangkok pass. It was got coming into flower (8860).

Kadsura? A big climber, flowerless, but appearing as if *Kadsura lanceolata*, King, was found at 3,300 ft. under Fraser Hill towards Tras. (7868). The Malays call it Akar belewar.

ANONACEAE.

Uvaria sp. A big liane with a stem 1 in. through, unfortunately without flowers and without fruit. (8804).

Polyalthia pulchra, King, Mat. 60, pt. 2, p. 55. A small tree, endemic within the Peninsula, and montane, distributed upon the Taiping hills and G. Babu: upon the Main range from G. Kerbau to G. Mengkuang Lebar. It was obtained on Pine-tree hill at 4500 ft. (8533) in fruit. The fruit-stalks are coral-pink.

Goniothalamus macrophyllus, King, Mat. 60, pt. 2, p. 76. Koorders, 2, p. 252: Merrill, 260. A small shrub, little branched, distributed from Sumatra eastward to mid Java and north Borneo: in the Peninsula in the north montane, and is in Lankawi, and P. Adang, Penang, on the Taiping hills, and on the Main range of Perak, south to the Semangkok pass; further it occurs down approximately to sea level in Johore and Singapore. It was both in flower and fruit (8507, 8957): the wood is fragrant suggesting cinnamon. The Malays call it Tungging.

Goniothalamus sp. A small tree 30 ft. high found in flower (8896) and in fruit (7809), which matches none of the Peninsula species. The Malays call it Tampaian.

Anonacea. A tree of medium size, densely covered under the leaves with tawny felt, occurring upon the vein-quartz ridges (8684. 8930).

MENISPERMACEAE.

Limacia triandra, Miers: King, Mat. 58, pt. 2, p. 382. A climber, within the Peninsula, and extended northwards to Moultmein and French Indo-China: in the Peninsula montane, occurring in Lankawi, in Penang, on Kedah peak; and upon the Main range about Fraser Hill (8620) and on Bukit Kutu.

PITTOSPORACEAE.

Pittosporum sp. A bush with larger fruits than *P. ferrugineum*, Dryand. and not tawny under the leaves, but otherwise rather similar; as known at present quite local: it was obtained by Mr. Ridley at the Semangkok pass in 1904 (no. 12073) and now has been gathered at Fraser Hill (s. n.).

POLYGALACEAE.

Polygala venenosa, Juss.: King, Mat. 59, pt. 2 p. 130: Merrill, p. 324. A herb of the interior of Malaysia; in Sumatra, common in the forests of the Peninsula upon the mountains and to their feet sometimes, extended through Borneo to the Philippine islands. In the Peninsula recorded from Kedah peak, Penang, the Taiping hills, the Main range from G. Kerbau and the mountains of Telom to G. Tampin. It was found to be plentiful in the forest of Fraser Hill both in flower and with half ripe fruit (8590).

Xanthophyllum excelsum, Miq. Merrill p. 326: *X. affine*, Korth.: King, Mat. 59 pt. 2 p. 142: Koorders, 2 p. 453. A tree of the second rank in the forest, distributed from Tenasserim through western and north-eastern Malaysia extending from the Peninsula to Billiton and Java and through Borneo to the Philippines. It extends north to Tongkah in Lower Siam (lat. 8° N.), and southwards to Singapore both in the plains and on the hills. It was less common at Fraser Hill than *X. Maingayi*.

Xanthophyllum Maingayi, Hook. f.: King, Mat., 59 pt. 2. p. 136. An endemic small tree, distributed within the Peninsula, montane, on Penang, on the Taiping hills, and on the Main range from Perak to G. Tampin. About Fraser Hill it is numerically the commonest woody plant, being the universal under-tree of the hundred-feet high forest (8673). Like others of its genus the Malays call it Minyak herok, or baboon's oil.

CARYOPHYLLACEAE.

Drymaria cordata, Willd. Koorders, 2 p. 211. A weed which is to be considered as introduced through man into Malaysia, but from not-remote parts of Asia. It occurs in Sumatra through Java up to 6500 ft. In the Peninsula it occurs about Fraser Hill (7818) very sparingly, upon the roadside near to the Gap on the Semangkok pass, and at Guting Sempah on the crest of the Kuala-Lumpur-Bentong road.

PORTULACACEAE.

Portulaca oleracea, Linn.: King, Mat., 60, pt. 2, p. 84: Koorders, 2, p. 208: Merrill, p. 217. A weed of all warm countries: in the Malay Peninsula scattered up and down. It was found at about 3300 ft. on the road from the Semangkok pass to Fraser Hill.

GUTTIFERAE.

Calophyllum spectabile, Willd. King, Mat., 59, pt. 2, p. 175: Koorders, Java, 2 p. 617. A *Calophyllum* apparently this, but without flowers and without fruit, was collected at Fraser Hill. *C. spectabile* is a wide-spread tree occurring from the Andamans and Nicobars and Cochin-china through Malaysia to Fiji and the Society Is.

TERNSTROEMIACEAE.

Ternstroemia Scortechinii, King, Mat., 59, pt. 2, p. 193. A medium-sized endemic tree. It is known to occur on the Taiping hills, and on the Main range from the mountains of Telom to Fraser Hill, and is on Benom. It is probable that it is also on G. Tahan. At Fraser Hill it was found attaining 30 ft. in height and in fruit (7751 bis).

Adinandra acuminata, Korth.: King, Mat., 59, pt. 2, p. 189. A tree of second rank occurring in Sumatra and the Malay Peninsula. In the Peninsula it is not uncommon from Penang and

Taiping to Singapore. In the south of the Peninsula it grows at sea-level: but it is one of those species which in the north scarcely descend so low. It has not before this been got on the Main range (8947) unless some of the material at Calcutta came thence.

Adinandra dumosa, Jack: King, Mat., 59, pt. 2, p. 188: Koorders, 2, p. 611: Merrill, p. 391. A small tree distributed through Malaysia. In the Peninsula it is frequent at low elevations: but has been got at 3000 ft. on Kedah peak and on Mt. Ophir (Ridley in Jour. F. M. S. Mus. 7, p. 39). It occurs in the Andamans and the Nicobars. At Fraser Hill it is common: but the Fraser Hill specimens all fail to dry black as *A. dumosa* normally does. It attains there 50 ft. in height (7760). Mr. Cubitt's no. 6527 from Fraser Hill is the same as ours.

Schima Noronhae, Reinw.: King, Mat., 59, pt. 2, p. 201: Koorders, 2, p. 610: Merrill, p. 390. A fairly large tree, distributed from Lower Burma, and Sumatra into the Malay Peninsula, to Java, Borneo and Palawan: in the Peninsula most frequent in the north, and not quite to sea level; reaching 5,000 ft. on G. Tahan and on the Taiping hills. At Fraser Hill it is common, and was in flower.

Gordonia sp. The yellowish flowers of a species of this genus were seen on the ground between Fraser Hill and Pine tree hill: but the tree whence they had fallen could not be identified.

Saurauia nudiflora, D. C.: King, Mat., 59, pt. 2, p. 198: Koorders, 2, p. 604. A small tree in distribution in Sumatra, through Java and in the Malay Peninsula on the Taiping hills, on G. Tahan and on the Main range of Perak and Selangor. It is favoured by the interference of man, and takes possession of cleared areas: below Fraser Hill it was plentiful on slopes that had been mined at 3000-4000 ft. (7764, 7873), attaining 20-25 ft. in height. It is called Jelatang (Gajah, or Elephant nettle).

Saurauia rubens, Ridl. in Jour. Str. Br. Roy. As. Soc. 61, p. 1: A small endemic and very local tree producing its pendent flowers close to the base of the trunk in large groups. It carried flowers and fruit at Fraser Hill (8585): these fruits when ripe fall off their pedicels, which persist for a time. Curtis found it in flower in the same neighbourhood in May 1902, and Ridley in April 1911.

DIPTEROCARPACEAE.

Dipterocarpus cornutus, Dyer: King, Mat., 61, pt. 2, p. 93. A lofty tree occurring down the Peninsula from Kedah to Singapore; and ascending the Main range on the east side under Fraser hill to about 3300 ft. where it was in flower (s. n.).

Shorea bracteolata, Dyer: King, Mat., 61, pt. 2, p. 117. This lofty tree ascends to about 3300 ft. on the Selangor face of the hills under Fraser Hill. The species is distributed from Penang to Malacca and in Pahang, within the Peninsula, and is in Sumatra.

MALVACEAE.

Urena lobata, Linn.: King, Mat., 60, pt. 2, p. 13: Koorders, 2, p. 583: Merrill, p. 371. A pan-tropic weed. In the neighbourhood of Frazer Hill it follows man, as it is quite foreign to the forest which is the natural vegetation there: it is therefore most abundant where the land has been mined. Machado collected it near the Semangkok pass in 1903. Ridley in 1910 on Sakai clearings further north.

TILIACEAE.

Grewia fibrocarpa, Mast.: King, Mat., 60, pt. 2, p. 111. A tall bush, endemic, distributed generally in the lower ground of the Peninsula from Penang to Singapore, and upon the east side known from the islands of P. Tioman and P. Tinggi. It occurs at Fraser Hill in forest and carries its scarlet fruits (8606), one only as a rule as the result of a whole panicle of flowers. The pulp is not unpleasantly acid.

Leptonychia heteroclita, Kurz: Merrill, p. 378: *L. glabra*, Turcz.: King, Mat., 60, pt. 2, p. 94. A shrub, in distribution from Tenasserim and the Andamans down the Malay Peninsula to the northern edge of Johore and in Sumatra, to Borneo and to Celebes. It was found on the edge of a gully at Fraser Hill (7870), and it has been collected before near Fraser Hill (Ridley 15586) and G. Kerbau and in the mountains of Telom.

Elaeocarpus gambir, Becc.: Merrill, p. 370: *E. stipularis*: King, Mat., 60, pt. 2, p. 133: Koorders, 2, p. 369. A tree of moderate size and quick growth, able to take advantage of the clearings of man. It is distributed through western Malaysia except eastern Java and is in Tenasserim. In the Peninsula it occurs under the mountains in the north as well as on them; and in the south it is down at sea-level. It was in flower and in fruit at Fraser Hill and had attained 40 ft. in height; it carried a sprinkling of red dying leaves (7794) on fruiting branches.

Elaeocarpus jackianus, Wall.: King, Mat., 60, pt. 2, p. 137. A small endemic tree which is able to take advantage of the clearings of man. In distribution it is general down the western side of the Peninsula: in Penang it occurs from the coast to the hill-tops at 2500 ft.: it is common at low elevations in Perak and down through Selangor and Malacca to Singapore. About Fraser Hill in places that have once been cleared, young plants of this are very conspicuous (7788), which by their cordate leaves may be distinguished varietally, as var. *cordatu*, the leaves being 22 x 12 cm.; the berries sparingly pilose: their pedicels very hispid.

Elaeocarpus paniculatus, Wall.: King, Mat., 60, pt. 2, p. 129: Merrill, p. 371. A tree of the Malay Peninsula Banca and northern Borneo: it occurs in the lowlands of the Peninsula from Lankawi and Kuantan to Singapore; from the hills it has scarcely been recorded. At Fraser Hill it was found flowering sparingly (8567).

Elaeocarpus reticulatus, Ridl. in Jour. Str. Br. Roy. As. Soc. 61, p. 2. A bush about 6 ft. high carrying its berries upright; endemic and confined to the Main range from G. Kerbau to G. Mengkuang lebar. It was got at 7000 ft. on G. Kerbau, at 5000 ft. on G. Mengkuang lebar: at Fraser hill it occurs at 1200 ft. on vein-quartz (8897).

Elaeocarpus sp., near *E. apiculatus*, Mast. A small tree differing in small points from this species was collected at Fraser Hill in fruit. (8570). *E. apiculatus* is a tree of low elevations from Penang to Singapore down the west side of the Peninsula.

GERANIACEAE.

Impatiens oncioides, Ridl., ex Hook. f. in Kew Bull. 1909, p. 11. A herb with beautiful yellow flowers found by water, endemic and montane, occurring along the higher ground of the Main range from G. Kerbau and Telom to G. Menuang Gasing at the head of the Langat valley in Selangor. It occurs at Fraser Hill with clear lemon-yellow flowers (8589) and more rarely with primrose yellow flowers (8943). It does not descend much below. The spur is in the mid-line of the flower.

RUTACEAE.

Evodia pachyphylla, King, Mat., 62, pt. 2, p. 210. An endemic shrub, montane and of very limited distribution in the Peninsula, occurring on the Main range from G. Kerbau, G. Bujong Malaka and Telom down to Fraser Hill where it was found on a vein-quartz ridge and also upon the very summit of Pine-tree hill at 4800 ft. which is west of Fraser Hill in the variety *grandis*, King. It was obtained in flower (8541). The flowers are of a cream colour.

BURSERACEAE.

Canarium rufum, A. W. Benn.: King, Mat., 62, pt. 2, p. 244. An endemic tree common at low elevations in Perak, extending thence southward to Malacca, and found also in the interior of Pahang. Fraser Hill (7831) at 4200 ft. is its uppermost limit as at present observed. It was sterile.

Trigonochlamys? A big tree growing at Fraser Hill, sterile (7802).

MELIACEAE.

Aglaia sp. A tree with hard wood and sparse foliage called by the Malays Tenkohalan, was collected in fruit (8680). It appears to be the species referred to in the Materials (Jour. As. Soc. Beng., 64, p. 65) by Sir George King with his collector's number 4606. The Sakais are said to eat the fruit.

CELASTRACEAE.

Salacia sp. near to *S. latifolia*, Wall. A sprawler found in mine area on the east of Fraser Hill at about 3600 ft., in flower (8600).

AMPELIDACEAE.

Vitis elegans, Kurz, King, Mat., 65, pt. 2, p. 392. A handsome vine endemic except that it extends to Banca, very plentiful about sea-level in the south of the Peninsula, but northwards rare: it has been collected in Malacca, and in Perak (probably Larut); also there exists a specimen carrying a Penang label, but not properly authenticated. It is very common at Fraser Hill (8445) and was both in flower and in fruit, its fruits small black berries.

Vitis furcata, Laws.: King, Mat., 65, pt. 2, p. 399. A rather small vine, in distribution in Sumatra and in the Malay Peninsula, by no means uncommon under the hills down the west side of the Peninsula from Penang to Singapore, in the Taiping hills and down the Main range from the mountains of Telom southwards. It was in flower and in fruit, (7787).

Vitis mollissima, Wall.: King, Mat., 65, pt. 2, p. 402. A common vine with large white berries exceedingly irritant to the throat (whence the Penang Malay name for it of Kesarkitan burong or bird's complaint) found from Burma, the Andamans and the Nicobars, and through the Malay Peninsula: in the Peninsula in the lowlands chiefly. It carried ripe fruit at Fraser Hill (s. n.).

Vitis trifolia, Linn.: King, Mat., 65, pt. 2, p. 688: *Cissus carnosa*, Gagnep.: Koorders, 2, p. 561: *Columella trifolia*, Merr.: Merrill, p. 368. A rather small vine, widely distributed from north-western India to southern China and through Malaysia to New Guinea. In the Peninsula it is not uncommon in the low country; but as regards the hills it has only been collected where roads have been made across the Main range, and its presence is artificial. It is not uncommon in cleared ground at Fraser Hill both with upwardly directed flowers and green fruits in September (8568).

Pterisanthes pulchra, Ridl. in Jour. Str. Br. Roy. As. Soc., 61, p. 2. A small woodland vine, endemic and absolutely local, very common, but very rarely flowering (8924). Mr. Ridley remarks on the difficulty of finding its flowers. He records it as on rocks but it is within our experience under trees that it is to be found; it was got upon vein-quartz and granite soils.

ILICACEAE.

Ilex sp. A bush attaining 10 ft. in height with black 5-celled fruit, growing on vein-quartz (8921).

Ilex sp. A small stiff tree which has been collected on Bukit Etam (Kelsall no. 1845). It was found at Fraser Hill in flower (8693).

ANACARDIACEAE.

Gluta ? A tree attaining 80 ft. in height rather like *G. elegans*, Kurz, but larger-leaved, which the Malays distinguish as Renga-gunong or mountain rengas (8678).

LEGUMINOSAE.

Millettia sericea, W. and A.: Prain, Mat., 66, pt. 2, p. 88: Koorders, 2, p. 382: Merrill, p. 303. A climber, distributed in western Malay-sia:—Sumatra, the Malay Peninsula, north Borneo and through all Java, high and low. In the Peninsula it occurs through the low country on the west side from Penang to Singapore, owing some of its spread to the agency of man, and this is particularly the case about Fraser Hill where it occurs on old mined lands, and newly cleared house-sites (8662). The Fraser Hill plants are rather small-leaved, as are also some from Penang.

Desmodium heterophyllum, D. C.: Prain, Mat., 66, pt. 2, p. 135: Koorders, 2, p. 387: Merrill p. 301. A prostrate weed, spread from the Mascarene islands through southeastern Asia, from the wetter Himalaya, and the wetter parts of southern India and Ceylon, southern China, and Malaysia to the Philippines. In the Peninsula it seems not uncommon in the low country, but of its occurrence in the hill there is only evidence that it occurs on G. Kerbau. It was obtained, not abundantly, at about 3500 ft. in the mined lands under Fraser hill over Tras, (7874) whither obviously it has come with the help of man. It occurs in Java both on and under the mountains.

Desmodium laxum, D. C.: Prain, Mat., 66, pt. 2, p. 138: Merrill, p. 304. An upright herb, wide-spread from the eastern Himalaya and China to the Malay Peninsula and to north Borneo. It is uncommon in the Malay Peninsula, and on the Main range has been got only in Ulu Batang Padang and in Telom, and now within a hundred feet of the Gap at the Semangkok pass (8851) i. e. about 3000 ft.

Bauhinia cornifolia, Baker: Prain, King in Jour. As. Soc. Beng., 66, pt. 2, p. 186. A magnificent woody climber, visible by the mass of its flowers at half a mile away, endemic, and montane but closely allied to *B. bidentata*, Jack, with a wider distribution from Sumatra to the Philippines. In the Peninsula it occurs in Penang, on the Taiping hills, on the Main range from G. Bujong Malaka to G. Angsi in Negri-Sembilan, and just under the hills in Selangor; also on Benom in Pahang. It is common at Fraser Hill (8586).

Pithecolobium angulatum, Benth.: Prain, Mat., 66, pt. 2, p. 274: Koorders, 2, p. 356: Merrill, p. 292. A small tree, doubtfully distinct from the Javanese *P. montanum*, Benth., which is there a feature of certain montane forests; in distribution from the Eastern Himalaya through Burma and Siam to Sumatra,

Singapore, Borneo and the Philippines, also in the Andamans and the Nicobars. In the Peninsula it is on the hills of Penang, on the Main range at G. Batu Puteh, and in the south from Kuala Lumpur to Singapore at low levels. At Fraser Hill it appears to owe its place to man, and was found as a small tree not yet at flowering (8663). The Malays call it *Petai belalang*, or grasshoppers' Parkia.

ROSACEAE.

Pygeum ovalifolium, King, Mat., 66, pt. 2, p. 292. A small tree, endemic, and of a very restricted distribution, collected by Sir George King's collector at some unrecorded place in Perak, elevation 5000 ft., and now at Fraser Hill (8505, 8558). There is a gland at the base of the leaf below upon each side of the midrib. The Malays call it *Sepuleh hutan*, or jungle *Fragaraea*.

Pygeum Maingayi, Hook. f.: King, Mat., 66, pt. 2, p. 288. A small shrub endemic and montane or submontane, found in upper Perak and down the Main range from Perak to G. Tampin, then in the forests of Malacca and upon G. Pulai in Johore. It was in flower and in fruit at Fraser Hill (7824, 8405). Though a shrub only at Fraser Hill in Negri Sembilan it seems to be a tree; or two species are confused.

Rubus glomeratus Blume: King, Mat., 66, pt. 2, p. 295: Koorders, 2, 324: Merrill, p. 288. A bramble, montane in the north of the Malay Peninsula, and in the south down near sea-level, in British North Borneo and through Java. In the Peninsula, in Penang it is above 1000 ft.; in the Taiping hills it is at and about 4000 ft.: it is, at Fraser hill above 4000 ft., both in cleared places and in the direction of Pine-tree hill in a landslip area (8561): it was found also east of the Gap in Semanokok pass, and Machado collected it in 1903 somewhere near the Gap: it is known to occur on Bukit Kutu.

Rubus rosaefolius, Smith: King, Mat., 66, pt. 2, p. 296: Koorders, 2, p. 326: Merrill, p. 288. A small shrub with a pleasant fruit and for that reason encouraged by man throughout its distribution, which is from Kamaon in the north-western Himalaya to Japan, and outwards, in hilly regions, to Borneo and through Java. In the Malay Peninsula it occurs upon the very tops of the hills in Penang, on the Taiping hills from 4000 to 5000 ft., and down the Main range from Telom to Ginting Sempah just north-east of Kuala Lumpur. At Fraser Hill it is very common chiefly in the neighbourhood of the old mines.

SAXIFRAGACEAE.

Weinmannia Blumei, Planch.: King, Mat., 66, pt. 2, p. 299: Koorders, 2, p. 311: Merrill, p. 287. A medium-sized tree extending from Sumatra to (apparently) British North Borneo, and through Java. In the Peninsula it is found on the Taiping Hills

from 4500 to 5000 ft., on G. Tahan and on G. Bubu at 3300 ft., on the Main range about Fraser Hill (8653), on Benom and on Mt. Ophir. It is called Kasai bukit (hill Pongamia) by the Malays, and is by no means uncommon.

HAMAMELIDACEAE.

Bucklandia populnea, R. Br.: King, Mat., 66, pt. 2, p. 308. A tree of considerable size found from the Central Himalaya down in hilly regions to Sumatra and Java: in the Malay Peninsula, collected on G. Inas at 5000 ft. in Perak, and on the Main range in Ulu Batang Padang at 3900 ft., on G. Tahan, and on Benom. Under Fraser Hill (8855) it occurs commonly as an immature tree in mined lands from 3300 to 3700 ft. in the Upper Tras valley. As it reaches 6000 ft. in the Khasia hills, 3300 ft. is a relatively low elevation.

MYRTACEAE.

Tristania Maingayi, Duthie: King, Mat., 70, pt. 2, p. 72. An endemic tree but only uncertainly distinct from *T. merguensis*, Griff., which as its name implies occurs in Tenasserim (as well as in the Peninsula) and extends to Borneo. *T. Maingayi* is found on the hills of Penang and on Kedah peak and was obtained as an 80-foot-high tree at 4000 ft. in Fraser Hill (7752) with flowers.

Rhodamnia cinerea, Jack: Merrill, p. 423: *R. trinervia*, Blume: King, Mat., 70, pt. 2, p. 74: Koorders, 2, p. 673. A small tree distributed from Tenasserim southwards through western Malaysia (unless it fail in east Java), to the Philippines and to north Australia: in the Peninsula it is very common at low levels, but in the higher hills possibly is rare. At Fraser Hill it occurred as a small tree with leaves of less than the usual size, at 4,100 ft. (7832).

Rhodamnia uniflora, Burkill; *R. trinervia*, var., *uniflora* Tidl., in Jour. F.M.S. Mus., 4, p. 146: *R. trinervia*, Ridl. in Jour. F.M.S. Mus., 2, p. 114. A montane endemic tree, occurring on G. Tahan, and at Fraser Hill, where it is common upon ridges of vein-quartz (8656, 8941), and attains a height of 60 ft. The young leaves are yellow below, the fruit a dull purple. On the breadth of the leaves and upon their colour below the species is to be distinguished, and not as the name suggests upon the fewness of the flowers from the nodes, for some varieties of *R. cinerea* exist wherein the flowers may be very few. The G. Tahan specimens seen are Wray's and Robinson's No. 5500 from between 5000 and 6000 ft., and Ridley's Nos. 16024 and 16272 from "Wray's camp." It is said also to be on Mt. Ophir, and G. Kerbau: but specimens have not been seen.

Eugenia corrugata, King, Mat., 70, pt. 2, p. 93. A small tree with dark foliage and hard wood, occurring at Fraser Hill

(8803), endemic within the Peninsula. The locality whence the type came in not exactly recorded but was probably on or under the Main range.

No. 7813 from Fraser Hill is an *Eugenia* which also may perhaps be this species.

Eugenia zeylanica, Wight: King, Mat., 70, pt. 2, p. 108: Merrill, 431. A tree of fifty feet with a rather small broken head, in distribution in southern India and Ceylon in the Andamans, in Sumatra, the Malay Peninsula and Borneo. In the Peninsula it occurs in Lower Siam at least from Takuapa, and southwards down both sides to Singapore. It was in flower at Fraser Hill (8677). The Fraser Hill specimens have smaller leaves than is usual at lower elevations.

Eugenia valdevenosa, Duthie; King, Mat. 70, pt. 2, p. 111. A small tree, endemic, occurring in Penang, the Taiping hills, and on the Main range from above Gopeng down into northern Negri Sembilan. It was obtained in fruit (7811, 8829), as a tree 25 ft. high.

***Eugenia* sp.**, apparently endemic, and an undescribed species. A tree occurring at Fraser Hill in flower (7751). It has curiously crested branches, which suggest, but differ considerably from, those of *E. selosa*, King.

Eugenia microcalyx, Duthie; King, Mat., 70, pt. 2, p. 124. A medium sized tree, endemic, distributed down the west coast of the Peninsula from Penang to Singapore and in the hills above Gopeng, in Ulu Buhong and about the Semangkok pass. It was in flower at Fraser Hill (7796).

***Eugenia* sp.**, near *E. valdevenosa*, Duthie; but with more coriaceous and smaller (12 x 6 cm.) leaves, was got on Pine-tree hill at 4,800 ft. (8535).

Eugenia oreophila, Ridl. in Jour. Str. Br. Roy. As. Soc., 61, p. 9. A shrub very closely allied to *E. jugalis*, Ridl., endemic and local, described from specimens collected in Ulu Semangkok by Mr. F. Dennys in 1907 as Kelat bukit or hill *Eugenia*; found by us in flower at Fraser Hill (8899) and at the Trigonometrical station immediately over the Gap upon the east side of the Semangkok pass (8870).

***Eugenia* n. sp.**, with obovate coriaceous leaves, 8 x 4 cm. the veins most obscure, was got in flower (8685) at 4,300 ft.

***Eugenia* sp.**, apparently near *E. corrugata*, King, with leaves about 14 x 7 cm. drying brown, and with flowers about 1.5 cm. across, was got in the valley of Fraser Hill (7777).

***Eugenia* sp.** A tree with red bark, sterile, here and there about Fraser Hill (7806).

Barringtonia Scortechinii, King, Mat., 70, pt. 2, p. 138. A tree of second rank, endemic and montane or submontane except

that it has been collected at Temerloh in Pahang, found in Penang, in the Taiping hills and on G. Bubu, in the Main range from Fraser Hill (8691) to G. Berumban in Negri-Sembilan, reaching the foot of Bukit Kutu. It carried deep crimson flowers on the end of branches, hanging into the light-diffusion space of rather dense one-hundred-feet high forest.

MELASTOMACEAE.

Melastoma malabathricum, Linn.: King, Mat., 69, pt. 2, p. 6: Koorders, 2, p. 690. A shrub of wide distribution, occurring from the Seychelle islands, through the parts of India which are damp enough, into China, and through Malaysia to northern Australia and to New Caledonia. In the Peninsula it is general, and owes its abundance largely to man; but not its presence, for it can hold its own in light forest: and it reaches 5,000 ft. on G. Tahan. It is plentiful at Fraser Hill (8574) in the variety *perakense*.

Blastus Cogniauxii, Stapf: King, Mat., 69, pt. 2, p. 13: Merrill, p. 438. A weak shrub of shade with small inconspicuous flowers, distributed down the Malay Peninsula and in northern Borneo. In the Malay Peninsula it occurs in the Taiping Hills, in Upper Perak, on G. Tahan, on the Main range from Bujong Malaka and the Telom hills to Ginting Bidai east of Kuala Lumpur, on G. Taneng and G. Pantai in Johore, and again in low country about Kuala Lipis and in the south of Johore. It is frequent at Fraser Hill (8613).

Anerincleistus floribundus, King, Mat., 69, pt. 2, p. 17. A shrub 20 ft. high, endemic, and until found between Fraser Hill and the Gap, Semangkok pass, at about 3,500 ft., and west of Fraser hill on the track to Pine Tree hill at 4,300 ft. known only from the Taiping hills and on G. Bubu. Its terminal panicle of pink flowers with exposed yellow stamens is very conspicuous (8509).

Anerincleistus grandiflorus, Ridl. in Jour. Str. Br. Roy. As. Soc., 47, p. 45. A endemic and montane shrub, of limited distribution along the Main range from Fraser Hill to G. Mengkuang lebar. Curtis obtained it in the neighbourhood of the Semangkok pass at 2,000-3,000 ft. in May 1902: Mr. Ridley in flower in April 1911; the Hon'ble Mr. G. Hose collected it at Fraser Hill in flower in August 1919 and we found it at 4,200 ft. on one of the vein-quartz ridges of Fraser Hill (8939) flowering in September, 1922, but not freely. The specimens from the mountains further south are labelled 5,000 ft. and 5,400 ft. It carried flowers, with white petals and a pink calyx as well as ripe fruit.

Sonerila tenuifolia, Blume: Stapf and King, Mat., 69, pt. 2, p. 24: Koorders, 2, p. 692: Merrill, p. 442. A herb distributed through the wetter parts of western Malaysia, occurring in Sumatra, in western Java, in northern Borneo, and in the Malay Peninsula montane, on G. Bubu, on G. Tahan, on the Main chain from G.

Kerbau and the mountains of Telom to Bukit Etam at altitudes of 4,000 to 5,300 ft., and on Mt. Ophir. It was not seen at Fraser Hill, but at Pine tree hill, at 1,800 ft., where it is common (8542).

Sonerila rudis, Stapf and King, Mat., 69, pt. 2, p. 21. A herb growing in moss in forests, endemic, and montane from 3,000 ft. upwards over a restricted area of the Main range, from G. Kerbau, G. Bujong Malaka and G. Batu Puteh south to the Semangkok pass; very common at Fraser Hill both in flower and in fruit (8414, 8621). It propagates itself by runners to a considerable extent.

Sonerila albiflora, Stapf and King, Mat., 69, pt. 2, p. 28. A herb of the forest floor, endemic, and montane, occurring on the main range at 3,500 ft. and above, from G. Bujong Malaka to the Semangkok pass, and also on G. Kledang over Ipoh at only 1,000 ft. above sea-level. It was found between Fraser Hill and Pine-tree hill (8508) in flower and with ripe fruit. The flowers are pale pink, as well as white. The Hon'ble Mr. G. Hose who collected it below Fraser hill in 1919, obtained it at 3,800 ft.

Sonerila integrifolia, Stapf and King, Mat., 69, pt. 2, p. 34. An upright herb of shade, endemic, and montane or submontane, found on the Taiping hills, and under them on the west side; on G. Batu, on the Main range from Fraser Hill to Ginting Sempah north-east of Kuala Lumpur and under the Main range on the west side. It is very common at Fraser Hill (8540, 8602, 8641) both in flower and in fruit, and was got also above the Gap on the ascent towards G. Ulu Semangkok at 3000 ft. (8886).

Sonerila velutina, Ridl. in Jour. F. M. S. Mus., 4, p. 18. A herb, of a somewhat more upright habit and of a darker chestnut colour than the common *S. rudis*, endemic, and as far as known confined to the Main range between G. Kerbau, the mountains of Telom and the Semangkok pass occurring from 4500 ft. upwards. It was found at Pine-tree hill at 1800 ft. (8645), and on G. Ulu Semangkok which is south-east of the Semangkok pass.

Phyllagathis hispida, King Mat., 69, pt. 2, p. 16. A herb, endemic in the mountain-forests of the Peninsula, found on the Taiping hills, in upper Perak, on G. Tahan, and down the Main range from Ulu Batang Padang and the mountains of Telom to the Semangkok pass. It is very common at Fraser Hill and was in new flower (8623).

Marumia nemorosa, Blume: King, Mat., 69, pt. 2, p. 47: Merrill in Jour. Str. Br. Roy. As. Soc. p. 444. A woody sprawler, about 20 ft. long, occurring in the interior of western Malaisia, i.e. in Sumatra the Malay Peninsula and in Borneo. In the Peninsula it is found in the low country from Penang and Trengganu southwards to the Johore straits; it ascends the Taiping hills to 3500 ft., on Fraser Hill to above 4000 ft. (7791, 8647) and Bukit Kutu. It was found in flower and with half ripe fruit and is frequent. The rose-magenta flowers fall in the afternoon.

Dissochaeta pallida, Blume: King, Mat., 69, pt. 2, p. 52. A endemic woody sprawler extending from Tomah in lower Siam (lat. 6° N.) down to Singapore, ascending the mountains as in Penang, in the Taiping hills to 4500 ft., and on the Main range to about 4000 ft. It carried flowers and fruits at Fraser Hill, (8553, 8616).

Dissochaeta annulata, Hook. f.: King, Mat., 69, pt. 2, p. 50: Merrill, p. 445. A woody sprawler, occurring down the Peninsula and in northern Borneo. In the north of the Peninsula it is montane occurring on Western Hill in Penang, on the Taiping hills, at Fraser Hill (8628) in the Main range, on Mt. Ophir, on G. Pantai in Johore, and lastly in Singapore island within 500 ft. of sea-level.

Anplectrum pallens, Blume: King, Mat., 69, pt. 2, p. 57: Merrill, p. 443. A sprawler, distributed in the interior of western Malaysia from Sumatra to northern Borneo: within the Peninsula occurring as a submontane or montane plant, in Penang on Western Hill, on the Taiping hills from 2000 ft. downwards, on the Main range from the Semangkok pass to the neighbourhood of Kuala Lumpur, and under this range as well as extending southwards to Singapore. It was not observed at Fraser Hill itself, but was obtained at the Trigonometrical station immediately over the Gap of Semangkok pass on the east side at 3800 ft. (8872), in fruit.

Medinilla venusta, King, Mat., 69, pt. 2, p. 61. A shrub, endemic and possibly confined to the Main range; but the origin of the specimens which Sir George King used when writing his description is not recorded more nearly than "Perak." It is common as an epiphyte at Fraser Hill, and is a very beautiful plant (8430, 8554).

Medinilla crassinervia, Blume: King, Mat., 69, pt. 2, p. 64: Merrill, p. 447. A beautiful bush with large cherry-red fruits, extending from the Malay Peninsula eastwards to Borneo and on to Ternate, Banda and New Guinea. Within the Peninsula it is montane in the north, but descends to low levels in Singapore and Johore: in the north it occurs in Penang, on G. Tahan, and on the Main range from Ulu Batang Padang to Gua Batu or Batu Caves near Kuala Lumpur. It was found under Fraser Hill in the upper Tras valley in a mined area upon the tops of boulders, at 3600 ft. (7866).

Medinilla Clarkei, King, Mat., 69, pt. 2, p. 63. A beautiful bush with white flowers and white berries, endemic and montane within the Peninsula, found on Gunong Tahan at 3300 ft., on the Main range from G. Kerbau to G. Menkuang lebar, on Benom and again on the top of Mt. Ophir. It is not uncommon at Fraser Hill (8557), where also the Hon'ble Mr. G. Hose obtained it in August 1919.

Medinilla heterantha, King, Mat., 69, pt. 2, p. 61. Specimens with seven equal anthers (s.n.), but otherwise appearing to

he *M. heterantha* were obtained just under Fraser Hill in the upper Tras valley at about 3500 ft. *M. heterantha* is an endemic and montane species of the Peninsula which is recorded as occurring on the Taiping hills, and on the Main range on G. Batu Puteh.

Memecylon dichotomum, C. B. Cl.: King, Mat., 69, pt. 2, p. 75. A small tree, endemic, submontane found on Kedah peak, on the Taiping hills, on G. Bubu, on G. Tahan, down the Main range in Perak and Selangor; and at Gemas on the Johore-Negri-Sembilan boundary. It occurs at Fraser Hill as a small tree about 30 ft. high under other trees (8697). It is called Nipis kulit or "thin-bark," like several other small trees.

Memecylon heteropleurum, Blume: King, Mat., 69, pt. 2, p. 78; Merrill, p. 453. A shrub with beautiful pinkish-blue flowers and purple fruits; which contain a pink-fleshed seed: distributed in the interior of western Malaysia, i.e. in Sumatra, in the Peninsula and in Borneo. In the Peninsula it occurs from Penang down the western side to Singapore. It occurred as an epiphyte at Fraser Hill (7869) and has been collected on G. Tahan. Our specimens have a venation in the leaf closer than usual, but not closer than *Curtis 814*, from Penang which is admitted as this.

Memecylon myrsinoides, Blume: King, Mat., 69, pt. 2, p. 81; Koorders, 2, n. 702; Merrill, p. 454. A shrub, distributed through western Malaysia, Sumatra, the Peninsula, Banca, Java, Borneo and beyond in Celebes. In the Peninsula it is in the low country from Lankawi to Singapore; and the Fraser Hill locality is of a surprising elevation. It grew as a shrub 15 ft. high upon one of the vein-quartz ridges (8937) and was in flower. Is it really absent from western Java as Koorders implies?

Memecylon laevigatum, Blume: King, Mat., 69, pt. 2, p. 82; Merrill, p. 454. A shrub, in distribution from Tenasserim, the Andamans and Nicobars, through Sumatra, and the Peninsula to Banca, Java and Borneo. In the Peninsula it is found in the lowlands down both sides. It was not found at Fraser Hill, but at the Trigonometrical station immediately over the Gap, Semanokok pass, on the east side at 3800 ft. (8888), in fruit; and in want of flowers the determination is slightly doubtful.

LYTHRACEAE.

Daphniphyllum sonneratioides, Ham.: King, Mat., 67, pt. 2, p. 10. A tall tree distributed from the central Himalaya in hilly regions through Burma and Siam, to the Andamans and Nicobars, and to the Malay Peninsula, where it seems to reach its limit on the eastern slopes of the Main range not far from Kuala Lumpur. On the east side of Fraser Hill from about 3300 ft. (7867) downward almost if not quite to the foot of the range it occurs in groups by streams: it is present also on the west side, but is rare. It exists in Penang, on the Taiping hills and is common in the

valley of the Perak river near Kuala Kangsar and again about the mountains of Telom at 4000 ft. The Malays who eat the acid young fruit call it *berembang bukil*.

ONAGRACEAE.

Jussieuia fissendrocarpa, Haines, in Jour. As. Soc. Beng. N. S. 15. p. 313. A marsh-herb distributed from north-eastern India southwards at least to Singapore and possibly to the Philippines, and occurring down the Peninsula here and there in the lowlands. At Fraser Hill it was found in the vegetable garden under Fraser's bungalow (7850).

SAMYDACEAE.

Casearia esculenta, Roxb.: King, Mat., 67, pt. 2, p. 17. A shrub or small tree, distributed in southern India and Ceylon, and then from Tenasserim southwards to Sumatra and Singapore mostly in the low country, but also in the hills, as on Kedah peak, on the hills of Penang, and down the Main range from G. Kerbau and the mountains of Telom to G. Angsi. It is recorded as at 7300 ft. on Korinchi peak in Sumatra. It was found with rather small leaves in fruit on G. Ulu Semangkok, which is south-east of the Semangkok pass (8580).

CUCURBITACEAE.

Trichosanthes bracteata, Voigt: Koorders, 3, p. 297: Merrill, p. 584: *T. palmata*, Roxb.: King, Mat., 67, pt. 2, p. 29. A herbaceous climber distributed from the Himalaya to Ceylon and in Japan, as well as in China, thence southward through Sumatra, the Peninsula, Borneo, Java, Celebes, Timor to northern Australia: in the Peninsula not well collected and its presence is not attested for the south. At Fraser Hill it owes its abundance to the interference of man, and its stems extend over the exposed earth of the new roadsides, carrying globose green fruits in abundance (8562).

BEGONIACEAE.

Begonia tricornis, Ridl. in Jour. Str. Br. Roy. As. Soc., 75, p. 35. A herb of forest, endemic and montane, restricted to the Main range from the mountains of Telom to Ginting Bidai, east of Kuala Lumpur. At Fraser Hill it is not uncommon; it was found in fruit (8669) sparingly.

Begonia sp., not uncommon at Fraser Hill (8498) in flower growing in shade, half-prostrate and rooting at the nodes. The flowers are light pink, and the leaves are relatively broader than those of *B. tricornis*.

UMBELLIFERAE.

Eryngium foetidum, Linn.: King, Mat., 61, p. 71: Koorders, 2, p. 724. This American plant which is slowly spreading westward in Asia, is quite common at Fraser Hill round the old

mines, and down the valley towards Tras: so long as the forest is not allowed to close in, it will persist. Machado collected it near the Gap in 1903.

ARALIACEAE.

Heptapleurum, sp. A tree forty feet high, with dark claret flowers (8916), apparently a new species, found at 4000 ft.

Heptapleurum sp. A shrub 6 ft. high, with a prickly stem, is not uncommon at Fraser Hill (7882) and in the upper Tras valley (s.n.), allied to *H. ellipticum*, Seem., but differing in the inconspicuousness of the veins of the leaf.

Arthrophyllum diversifolium, Blume: King, Mat., 67, pt. 2, p. 59: Koorders, 2, p. 717: Merrill, p. 458. A small tree, distributed through western Malaysia and in the Andamans; in the Peninsula common all down the west side, whereas on the east side it has been collected only upon P. Tioman; but it is assuredly present. It was found in forest at Fraser Hill (7834) at 4200 ft.,— an upward extension of its recorded altitudes, in flower.

Arthrophyllum montanum, Ridl. in Jour. F. M. S. Mus. 4, p. 24. A shrub, endemic, confined to the Main range from the mountains of Telom to the Semangkok pass. It was found on veinquartz ridges at Fraser Hill in flower (8926), being three feet high only.

Arthrophyllum pinnatum, C. B. Clarke in part: King, Mat., 67, pt. 2, p. 59 in part. A small shrub, endemic apparently, occurring on the top of the hills in Penang, and on the Main range from G. Batu puteh to G. Mengkuang lebar. It was found on G. Ulu Semangkok at 3000 ft. (8865). The Mount Ophir plant differs.

CAPRIFOLIACEAE.

Viburnum sambucinum, Reinw.: King & Gamble, Mat., 72 pt. 2, p. 113: Koorders, 3, p. 285: Merrill, p. 512. A bush, spread through western Malaysia, in Sumatra, the Peninsula, Borneo and throughout Java, from about 1000 ft. to 5000 ft. In the Peninsula it is montane as regards the north, but descends to sea-level in Singapore: it occurs upon the summit of Government Hill, Penang, on the Taiping hills, and down the Main range from the mountains of Telom to G. Menkuang lebar. Often it owes its position to man in chief part, and this is the case at Fraser Hill, where it occurs about the old mines (7779). It was newly in flower.

Viburnum Beccarii, Gamble, Mat., 72, pt. 2, p. 114. A bush occurring in Sumatra and in the Malay Peninsula, montane. In the Peninsula it was first collected by Scortechini in Perak, probably in the mountains at some little distance to the north of Fraser Hill. It occurs at Fraser Hill (8631) and was in flower. It has been determined from descriptions only.

RUBIACEAE.

Uncaria dasyoneura, Korth.: King & Gamble, Mat., 72, pt. 2, p. 136. A woody climber, distributed in Ceylon, and then disjointedly in Sumatra and the Malay Peninsula. In the Peninsula it is montane: it occurs in Penang, and is on the Main range in Perak where Sir George King's collector got it: at Fraser Hill it is very abundant and in Malacca, probably on Mt. Ophir. It is also said that Lobb got it in Singapore; but then Lobb's plants are not accurately labelled in all cases. At Fraser Hill where it goes to the tops of fairly large trees, it was in flower and new foliage and with enormous quantities of fruit (8409): it was also on G. Ulu Semangkok. Haviland distinguished the Ceylon plants varietyally (Jour. Linn. Soc. Bot., 33, p. 82.)

Argostemma Yappii, King in King & Gamble, Mat., 72, pt. 2, p. 145. A half-epiphytic herb, endemic and of narrow distribution on the mountains, on G. Tahan above 5000 ft., and on the Main range from the mountains of Telom to G. Mengkuang lebar. It occurs at Fraser Hill (8573) at 4200 ft. and thence upwards to 4800 ft. in Pine tree hill (8527); and it occurs on G. Ulu Semangkok which is south-east of the Gap. It climbs the lowest one or two feet of tree trunks and has a very fleshy stem.

Argostemma urticaefolium, King: King & Gamble, Mat., 72, pt. 2, p. 146. A herb, perhaps occurring in Sumatra, and found upon the Main range of the Peninsula from the Telom mountains to Bukit Etam. It flowers about the Semangkok pass in May (Curtis 3748); and only in one spot were flowers found in September (8857).

Argostemma spinulosum, C. B. Clarke: King & Gamble, Mat., 72, pt. 2, p. 149. A herb, endemic, and montane, occurring on the Taiping hills, on the Main range from G. Batu puteh to Bukit Etam, and in Johore on G. Pantai. It is rare at Fraser Hill (8622).

Argostemma involucreatum, Hemsl.: King & Gamble, Mat., 72, pt. 2, p. 151. An endemic herb with beautiful white flowers montane, occurring on the Taiping hills, on G. Tahan, on the Main range from G. Kerbau, Bujong Malaka and the Telom mountains to the neighbourhood of Kuala Lumpur, on Benom, and on Mt. Ophir. At Fraser Hill it is perhaps the commonest herb in the forest and in September its flowers, turned downwards obliquely with a conspicuous large green nectary, were everywhere (8412); but towards Pine-tree hill it disappeared.

Ophiorrhiza erubescens, Wall.: King & Gamble, Mat., 72, pt. 2, p. 172. A small forest herb, occurring in Upper Burma and down the Malay Peninsula as far as Bukit Sedanan in Malacca. It is montane or submontane, but has been collected at 6500 ft. on Ridley's G. Berumban. It was found in fruit at Fraser Hill (8594) and on G. Ulu Semangkok (8887).

Mussaenda mutabilis, Hook. f.: King and Gamble, Mat., 72, pt. 2, p. 182. A woody sprawler, endemic, rather submontane than montane, distributed from (perhaps) Penang and Bundi south-wards to Singapore, occurring on the Taiping hills, on the Main range and on Mt. Ophir to 2000 ft. at least. It was found under Fraser Hill at about 3800 ft., exposing its brilliant scarlet flowers at a height of about 20 ft. from the ground in a place where a fallen tree had let light into the forest (7759).

Mussaenda villosa, Wall.: King & Gamble, Mat., 72, pt. 2, p. 183. A woody sprawler, distributed in Sumatra and in the Peninsula southwards to Malacca and Mt. Ophir: it occurs at low elevations, and the Fraser Hill plant (s.n.) appears to be varietally distinct from the lowland plant. It was found just above 4000 ft. The Mt. Ophir plant also differs.

Lucinaea Ridleyi, King in King & Gamble, Mat., 72, pt. 2, p. 178; Merrill, p. 558. A woody sprawler occurring in the hilly parts of the north of the Malay Peninsula and in north Borneo. In the Peninsula it has been got in the Taiping hills, and on the Main range in the Batu Padang valley and at Fraser Hill at 4300 ft. in flower (8681). Lobb collected specimens which exist in herbaria with the label "Singapore" upon them; but Lobb's labels are not always accurate.

Urophyllum glabrum, Wall.: King & Gamble, Mat., 72, pt. 2, p. 198; Merrill, p. 529; *U. arboreum*, Korth.: Koorders, 3, p. 255. A small tree distributed in western Malaysia from Sumatra, through the Peninsula, in western Java, in Banca, Borneo, and to the Philippines. It is one of the species which in the Peninsula occur at sea-level in the south; but are rare or absent in the lowlands in the north, however it is on P. Nipis, an islet off the Lower Siam coast near P. Adang,—but not in the usual form. It has been collected upon the Main range north of Fraser Hill; and is plentiful at Fraser Hill (8668, 8688) as a small tree 25 ft. high, in flower and in fruit. The Malays call it Tabosah.

Stylocoryna fragrans, Blume: King & Gamble, Mat., 72, pt. 2, p. 201; *Tarennia fragrans*, Merrill, p. 561. A shrub, distributed in Sumatra, down the Peninsula from Champawn in Lower Siam to Singapore upon both sides, and in Borneo. This is the first record of its occurrence in the higher hills. It was found at Fraser Hill at 4200 ft. (8686, 8882), and on G. Ulu Semangkok, in flower.

Webera salicira, Ridl. in Jour. F. M. S. Mus., 4, p. 34. A shrub, endemic and confined as far as is at present known, to the Main range from the mountains of Telom to Fraser Hill where it was got in the direction of Pine-tree hill (8513).

Rardia racemosa, Cav.: Merrill, p. 563. *Randia densiflora*, Benth.: King & Gamble, Mat., 72, pt. 2, p. 208; *R. oppositifolia*, Koord.: Koorders, 3, p. 297: A shrub, widely distributed from north-eastern India and southern China down the hilly regions of

Burma, in the Andamans and Nicobars, through Malaysia to north Australia: in the Peninsula it is a wide-spread lowland plant of the west side to Malacca: but it has not been collected as yet on the east side north of P. Tinggi. Upon the Main range it is certainly on G. Haram and on Bukit Kutu. It was collected at Fraser Hill (8442) carrying its fragrant white flowers.

Randia anisophylla, Jack: King & Gamble, Mat., 72, pt. 2, p. 209. A small tree or large shrub, in Sumatra and distributed freely down the west coast of the Peninsula from Penang to Singapore, unless rare in Perak, but as yet quite unrecorded for the east coast. It is not uncommon at Fraser Hill attaining 30 ft. in forest under tall trees, in flower (8446), and in fruit (8660). The Malays call it Kayu laha.

Rardia sp. A shrub unfortunately flowerless (8664), with two pairs of curved thorns at the base of each lower side branch for climbing, the lower pair of which two are brought against the parent axis by the angle at which the side branch stands,— a very perfect grapple arrangement.

Gardenia pulchella, Ridl. in Jour. F. M. S. Museums 4, p. 31. A fat stemmed small shrub with the flowers close to the ground, occurring in the mountains of Telom and it was found at Fraser Hill in immature fruit (8593).

Timonius diffusus, Ridl. in Jour. F. M. S. Mus. 4, p. 32. A small tree, endemic and montane, found on G. Tahan, and on the Main range in the mountains of Telom, where very common, and now at Fraser Hill (7801), in flower and in fruit, attaining 20 ft.

Timonius sp. near *T. montunus*, Ridl., a small tree found at Fraser Hill, with foliage 8 x 2 cm. and fruits 8 mm. long (8561). *T. montunus* occurs on G. Tahan.

Timonius n. sp. A small tree 10 feet high found on the vein-quartz ridges of Fraser Hill (8922 and s.n.) with a more or less fastigiate habit, carrying orange flowers, its leaves 8 x 3 cm., its ribbed fruits 12 mm. long.

Ixora Lobbii, Loudon: King & Gamble, Mat., 73, pt. 2, p. 78. A shrub, distributed through the Peninsula: it is very common in the lowlands from Khasum in Lower Siam (Lat. 8° 20' N.) to Singapore; it is but little recorded from the hills, as Penang, the Taiping hills, the Main range at G. Batu Puteh and G. Pantai in Johore. At Fraser Hill it was observed sporadic in the forest carrying its reddish salmon flowers (8607).

Gynochthodes sublancoolata, Miq.: King & Gamble, Mat., 73, pt. 2, p. 92: Merrill, p. 580. A woody climber, distributed in the interior of western Malaysia, from Sumatra through the Malay Peninsula to north Borneo: in the Peninsula down the west side from Penang to Singapore, and now obtained from the Main range

at Fraser Hill, where it is plentiful (8571, 8936 and s.n.), both in flower and in fruit; it occurred on vein-quartz ridges.

Psychotria viridiflora, Reinw.: King and Gamble, Mat., 73, pt. 2, p. 15: Koorders 3, p. 266: Merrill, p. 575. A half-woody plant spread through the whole of western Malaysia, i.e., Sumatra, the Malay Peninsula, the whole of Java and Borneo: in the Peninsula from Koh Pennan and Trang in Lower Siam (Lat. 7° 30' N.) southwards to Malacca, where it appears to be more common than elsewhere. It occurs at about 4000 ft. on the Taiping hills, and is in the mountains of Telom. It was got in fruit at Fraser Hill (8674), and ascends to 5000 ft. in Java.

Psychotria sarmentosa, Blume: King and Gamble, Mat., 73, pt. 2, p. 5: Koorders, 3, p. 265: Merrill, p. 573. A rather small woody climber, widely distributed, being in southern India and Ceylon, where it ascends to 1000 ft., in Burma, and in the Andamans, down the Peninsula, through Java and through Borneo. In Java it ascends to 6700 ft. It occurs at Fraser Hill on vein-quartz (8925). There is rather too much variability between the specimens put under this species for it to be considered as satisfactorily defined.

Chasalia rostrata, Miq.: King and Gamble, Mat., 72, pt. 2, p. 134: Koorders, 3, p. 268. A bush, distributed down the Peninsula not uncommonly from Larut to Singapore, and in west Java. It has been gathered before this on the lower slopes of the mountains of the Peninsula, e.g. the Main range in all three states, Perak, Selangor and the Negri-Sembilan, as well as on the lower slopes of Mt. Ophir but never before as high as Fraser Hill (7818, 8603). The Fraser Hill plants have hirsute pedicels.

Chasalia lurida, Miq.: Merrill, p. 576: *C. curvisflora*, Thwaites: King and Gamble, Mat., 72, pt. 2, p. 133: Koorders, 3, p. 268. A weak shrub of wide distribution, and apparently breaking up into subspecies, found in Ceylon and southern India, in north-eastern India, and down through Burma into Sumatra and Malaysia to the Philippines: in the Peninsula it occurs everywhere through the lowlands: it ascends Kedah peak, the Taiping hills and the mountains of Telom, but no altitudes are recorded, except 3,000 ft. for Kedah peak. It was found here and there in the forest about Fraser Hill carrying flowers as well as its black fruits (8526, 8534, 8582), and ascended to Pine tree hill at 4,800 ft. It attains almost 5,000 ft. in Java.

***Chasalia* sp.** This plant appears to be new and endemic within the Peninsula. It was collected near the Semangkok pass by Mr. Curtis in 1902, and by ourselves as a small tree 25 ft. high, with white flowers (8591).

***Cephaelis* sp.**, a one-stemmed woody plant, which is rather more slender than the next is common also at Fraser Hill (7810, 8627) where it grows in the forest in the same way. It also has been collected by Mr. Ridley (his No. 12073).

Cephaelis sp. A one-stemmed woody plant growing in shade and carrying its flowers horizontally, perhaps close to *C. Griffithii*, Hook f., is common at Fraser Hill (8135) where it was collected in 1911 by Mr. Ridley (his No. 15667), and occur also on G. Ulu Semangkok equally commonly.

Lasianthus rhinocerotis, Blume: King and Gamble, Mat., 72, pt. 2, p. 114: Koorders, 3, p. 271. A shrub, montane, occurring in Sumatra in the Malay Peninsula and on the mountains of west Java: in the Peninsula in the Taiping hills, on the Main range from the mountains of Telom and G. Batu puteh to Ginting Peras which is between the States of Selangor and Negri-Sembilan. It is not uncommon at Fraser Hill, in flower (8520, 8605).

Lasianthus longifolius, Wight: King and Gamble, Mat., 72, pt. 2, p. 116. A small tree with a most objectionable smell, endemic and submontane, on "G. Tungal" in Perak, and on the Main range southwards from Fraser Hill, to Kuala Lumpur, and recorded for "Malacca" probably meaning Mt. Ophir. At Fraser Hill it attains 15 ft. in height and is by no means uncommon in flower and with purplish red fruit (8519) also it is on G. Ulu Semangkok (8875). It may be called Kahawa utan or jungle coffee by the Malays. Specimens collected under no (8604) at Fraser Hill may also represent the same species.

Lasianthus oblongus, King and Gamble, Mat., 72, pt. 2, p. 127. A shrub, endemic occurring on Kedah peak, on the Taiping hills, and on the Main range from Fraser Hill to the neighbourhood of Kuala Lumpur where it descends to low levels. It was found in the mine area of the upper Tras valley under Fraser Hill at about 3,500 ft. (7865).

Paederia verticillata, Blume: King and Gamble, Mat., 72, pt. 2, p. 97: Koorders, 3, p. 276: Merrill, p. 580. A woody climber, distributed in Malaysia, from the Peninsula through north Borneo to the Philippines and also in the mountains of west Java. In the Peninsula it occurs at low levels down the west side from Kedah to Singapore and on the east side is in Trengganu. This is its first record for the mountains of the Peninsula: it was found at about 3,600 ft. under Fraser Hill in the upper part of the valley of the Tras stream (7863) in fruit.

Spermacoce ocymoides, Burm., Hook. f., Fl. Brit. Ind., 3, p. 200: *Borreria ocymoides*, D.C.: Koorders, 3, p. 281. A small herb, a weed very wide through the Tropics, but not yet universal in the Malay Peninsula. It has reached the Gap, but has not ascended to Fraser Hill.

COMPOSITAE,

Adenostemma Lavenia, O. Kze.: Merrill, p. 587: *A. viscosum*, Forst.: King and Gamble, Mat., 74, pt. 2, p. 28: Koorders, 3, p. 316. A pantropic herbaceous weed, following man, not yet

abundant in the Malay Peninsula, but probably increasingly spreading. At Fraser Hill it occurs about the mines, and particularly in the old workings of the upper Tras valley (s.n.)

Ageratum conyzoides, Linn.: King and Gamble, Mat., 74, pt. 2, p. 29; Koorders, 3, p. 317; Merrill, p. 587. A pantropic herbaceous weed, very common in the Peninsula but except for a specimen from Bukit Kutu and another got in a Sakai clearing in Telom unrecorded for the hills. It occurs at Fraser Hill up to 4,100 ft.,

Erigeron linifolius, Willd.: King and Gamble, Mat., 74, pt. 2, p. 812; Koorders, 3, p. 322; Merrill, p. 587. A herbaceous weed, more or less pantropic, scattered through the Malay Peninsula, but hitherto there have been no records of its occurrence in the mountains. It occurs in the mined area both at Fraser Hill and in the upper Tras valley below, in flower and fruit (s.n.).

Vernonia arborea, Buch.-Ham.: King & Gamble, Mat., 74, pt. 2, p. 26; Koorders, 3, p. 314; Merrill, p. 586. A tree distributed in southern India and Ceylon where it ascends to 5000 ft., in north-eastern India, not including the Himalaya, thence southwards through Burma into Sumatra and down through western Malaysia, on to Celebes and in north-eastern Malaysia in the Philippines. It ascends to 6500 ft. in Java. In the Peninsula it occurs through the lowlands, and the only specimens which have been seen from its mountains are those from Fraser Hill (7846), and some collected by Mr. Ridley. It was seen as a tree 25 ft. high in fruit.

Blumea balsamifera, D. C.: King & Gamble, Mat., 74, pt. 2, p. 33; Koorders, 3, p. 324; Merrill, p. 587. A big almost woody herb, distributed from the central Himalaya down through the hilly parts of Burma to Malaysia, in Java, where it is more common in mid and east Java than in west Java; in the Peninsula it occurs throughout the lowlands except deep in the forests. It occurs at Fraser Hill up to 1100 ft. in some abundance.

Bidens pilosa, Linn.: King & Gamble in Mat., 74, pt. 2, p. 45; Koorders, 3, p. 339; Merrill, p. 589. A herbaceous weed pantropic, not uncommon through the Malay Peninsula in the lowlands and not absent from the hills though few have taken the trouble to record any observations on it. Mr. Ridley, however says of it, that it is found in Sakai clearings in the mountains of Telom. It was found under Fraser Hill in the mine area of the upper Tras valley at 3300 ft. (7880) in flower.

Frechtites valerianaefolia, D. C.: Koorders, 3, p. 342; Merrill, p. 589. A herb of American origin becoming pantropic; in the Peninsula as yet rare; but occurring in Sumatra, Java (which it reached in 1845 with coffee seed) Dutch Borneo. It is found at Fraser Hill (s.n.)

Gynura bicolor, D. C.: King & Gamble, Mat., 74, pt. 2, p.

A herbaceous weed occurring in southern China and down Malaysia, where it occurs up and down the Peninsula: found thickly about the mines at Fraser Hill (s.n.) in fruit.

Gynura sarmentosa, D. C.: King & Gamble, Mat., 74, pt. 2, p. 9; Koorders, 3, p. 344; Merrill, p. 590. A sprawling herb, introduced from Siam into Sumatra and western Malaysia generally through to the Philippine islands and New Guinea: in Java more common in the western end than elsewhere. In the insula it occurs in the plains southward to Singapore, and it has been recorded for the mountains thus,—the Taiping hills, and the Main range from the mountains of Telom to the old road from Kuala Lumpur into Pahang. It was found under Fraser Hill at 1000 ft. towards the Gap in flower and in fruit (7763) on a cleared side.

Emilia sonchifolia, D. C.: King & Gamble, Mat., 74, pt. 2, p. 38; Koorders, 3, p. 345; Merrill p. 590. A herbaceous panicoid weed, common through the Peninsula, and recorded as ascending high upon the Taiping hills. It was found but not abundantly at 4000 ft. at Fraser Hill, and under it in the mine area of upper Tras valley (7826).

CAMPANULACEAE.

Pratia begoniifolia, Lindl.: Koorders, 3, p. 303. A small trailing herb distributed from the central Himalaya and southern China through Burma to Sumatra, the Malay Peninsula and Java: the Peninsula it occurs in the Main range from G. Kerbau to Muluang gasing. At Fraser Hill it is quite common about the mines, and possibly owes its abundance there more to man than to nature.

Pentaphragma Scortechirii, King & Gamble, Mat., 74, pt. 2, p. 53. An herb of forest, distributed through the Peninsula and into Lingga. In the north of the Peninsula it is generally confined to the hills, but it reaches sea-level in Singapore and southern Malaya: it occurs in Penang, in the Taiping hills, at 3000-4000 ft., on the Main range from G. Kerbau and the mountains of Telom and G. Bujong Malaka into Negri-Sembilan on Bukit Mertajam; it is also on the hills of the Dindings, on G. Keledang near Ipoh, and on G. Pulai in Johore. At Fraser Hill it is not uncommon and was in flower (8625).

VACCINIACEAE.

Agapetes Griffithii, C. B. Clarke: King & Gamble, Mat., 74, pt. 2, p. 59. A woody epiphyte with a swollen tap root, functioning as a store for water, endemic and montane, found on the Taiping hills on the Main range at G. Batu Puteh and now at Fraser Hill, old specimens are labelled "Malacca," which means Mt. Ophir.

At Fraser Hill it is common (7828). These Fraser Hill plants have the calyx slightly larger than the Taiping hills plants.

Agapetes micrantha, Ridl. ms in Herb. Singap. A shrub, endemic and very local in the Main range, having been collected first at Fraser Hill and now on Pine-tree hill (8537), but without flowers.

Pentapterygium Scortechinii, King & Gamble, Mat., 74, pt. 2, p. 60. A woody epiphyte endemic, and montane, occurring upon the the Main range from the mountains of Telom to Pine-tree hill where it was found at 4800 ft. in flower and in fruit (8518). King's collector gave its altitude as about 1500 ft. in Perak.

ERICACEAE.

Diplycosia latifolia, Blume: King & Gamble, Mat., 74, pt. 2, p. 71: Koorders, 3, p. 8: Merrill, p. 461. A small shrub, with an abnormal distribution as follows,—in Sumatra, in the Peninsula on G. Tahan, on the Main range in Perak and down to Bukit Etam, on Benom, in Borneo in Dutch Borneo and in Java upon Tosari near the eastern end of the island. It was found in fruit at Pine-tree hill (8532).

Diplycosia sp.: Merrill, p. 161: *Vaccinium microphyllum*, King & Gamble, Mat., 74, pt. 2, p. 62. A shrub, apparently endemic occurring on Kedah peak on the Taiping hills, on the Main range from G. Batu puteh to Bukit Etam, and on Mt. Ophir. At Fraser Hill it is very abundant (7895, 8912).

Rhododendron Wrayi, King & Gamble, Mat., 74, pt. 2, p. 75. A shrub, endemic and montane, found on G. Tahan, and on the Main range on G. Kerbau, in the mountains of Telom and southwards to G. Ulu Semangkok. It was found to be one of the most abundant of woody plants upon the top of Pine-tree hill, and was in fruit (8539).

Rhododendron jasminiflorum, Hook. f.: King & Gamble, Mat., 74, pt. 2, p. 88: Koorders, 3, p. 7: Merrill, p. 461. A shrub in distribution from Sumatra, in the Malay Peninsula and in Borneo: it is doubtful if it has occurred wild in Java. In the Peninsula it occurs on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range in the mountains of Telom and down to Fraser Hill; and it occurs on Mt. Ophir. It was found in flower at Fraser Hill (8427).

Rhododendron malayanum, Jack: King & Gamble, Mat., 74, pt. 2, p. 78: Koorders, 3, p. 6: Merrill, p. 462. A shrub generally epiphytic, distributed through western Malaysia in Sumatra, the Peninsula, western Java and Borneo: in the Peninsula on the Taiping hills on G. Tahan, on the Main range from G. Kerbau to Bukit Etam and on Mt. Ophir. It is common about Fraser Hill, and was in flower and in fruit (7815, 8436); and

thence it continues to Pine-tree hill (8545). The statement that it occurs in Penang is an error as far as it is based upon the Singapore herbarium, where a specimen from Taiping hills has been mislabelled "Penang."

Vaccinium bancanum, Miq.: King & Gamble, Mat., 74, pt. 2, p. 64; J. J. Smith in Meded. Dept. Landbouw, 18, p. 159; Merrill, p. 465. A small tree found in the Malay Peninsula, in Banca, in Borneo and Billiton and in a variety in Java. It occurs at Fraser Hill upon the vein-quartz ridges and was in flower (8928). In the Peninsula it grows on the Taiping hills, on the Main range about the Semangkok pass, and on Mt. Ophir.

MYRSINACEAE.

Maesa perakensis, Ridl. in Jour. F. M. S. Mus. 4, p. 45. A bush, endemic and montane, distributed in the Taiping hills and upon the Main range from the mountains of Telom to the Semangkok pass. At Fraser Hill and in the upper Tras valley below it, it is not at all uncommon and was in flower and in fruit (s.n.)

Embelia Ribes, Burm. f.: King & Gamble, Mat., 74, pt. 2, p. 104; Koorders, 3, p. 30; Merrill, p. 476. A woody climber, of wide distribution, extending from the central Himalaya to Ceylon and from southern China down into Malaysia in Sumatra, the Peninsula west Java and northern Borneo. In the Peninsula it is through the low country; it ascends into the mountains of Telom, and was found in fruit at Fraser Hill (8619).

Labisia pumila, Benth. & Hook. f.: King & Gamble, Mat., 74, pt. 2, p. 115; Koorders, 3, p. 30; Merrill, p. 473. A half-woody herb, variable, and of rather general distribution in Indo-china and through Malaysia, from Sumatra, through the Peninsula, and Java, in Borneo and to the Philippines: it is in all parts of the Peninsula down to Singapore, and in the Dutch islands south of Singapore and in the Taiping hills and Main range is developed into the variety *alata*. It is very common at Fraser Hill, (8450), but at the season of our visit generally sterile.

Labisia longistyla, King & Gamble, Mat., 74, pt. 2, p. 117. A half-woody herb, endemic and montane, very restricted apparently on the Main range where it has been collected only on the section between G. Kerbau and the mountains of Telom and the Semangkok pass. At Fraser Hill it is much less common than *L. pumila*, but in ascending to Pine-tree hill it gradually increases in abundance (8538), until it has replaced the other. Its leaves are of a lighter green than those of *L. pumila*, and its fruits a trifle larger.

Ardisia retinervia, Ridl. in Jour. Linn. Soc. Bot. 38, p. 315. A shrub, endemic and montane, described upon specimens collected on G. Tahan above 5000 ft., and now its range is extended to Fraser Hill, where it is one of the species growing upon the vein-quartz ridges (7833).

Ardisia chrysophyllifolia, King & Gamble, Mat., 74, pt. 2, p. 123. A small shrubby plant, endemic and local, found on the Main range from G. Kerbau and Ridley's G. Berumban and G. Batu patah to G. Ulu Semangkok. It is frequent at Fraser Hill, in flower (8528), as well as in fruit (8559), and was found on the south east side of the Gap upon G. Ulu Semangkok.

Ardisia colorata, Roxb.: King & Gamble, Mat., 74, pt. 2, p. 130; Koorders, 3, p. 284; Merrill, p. 470. A small tree of rather wide distribution,—from north-eastern India through Burma into Sumatra, the Peninsula and Borneo, and to mid Java: in the Peninsula it is general in the low country and upon the mountains normally at any rate to 2000 ft.: it ascends higher also—thus to the crest of the hills in Penang at 2500 ft., on the Taiping hills, and on the Main range on G. Kerbau, on Ridley's G. Berumban and elsewhere and at Fraser Hill it is abundant about 4000 ft. and attains 50 ft. in height. It is at the Padang Batu on Mt. Ophir. Our no. (8514) is the type and our no. (8698) is the variety *complanata*. The Malays call it Nielo utan.

Ardisia rosea, King & Gamble, Mat., 74, pt. 2, p. 150. A small shrub, endemic and montane, distributed on the Taiping hills, on G. Tahan and on the Main range from the mountains of Telom to the G. Ulu Semangkok, where we got it in flower (8891).

Ardisia Maingayi, King & Gamble, Mat., 74, pt. 2, p. 151. An under-shrub, of 2-3 ft., endemic and apparently montane, occurring on G. Tahan, on the Main range from the mountains of Telom to G. Ulu Semangkok, and then on Mt. Ophir (Maingay's "Malacca" specimens doubtless being thence). We found it at Fraser Hill (8410), and on G. Ulu Semangkok (8874).

SAPOTACEAE.

Payena? A Sapotacea occurs on the ridge of Fraser Hill, possibly of this genus, a tree 100 ft. high (7766) of which no more than the foliage could be obtained.

EBENACEAE.

Diospyros Scortechinii, King & Gamble, Mat., 74, pt. 2, p. 212. A tree, endemic, montane except that it appears to occur low down in P. Tiunan off the east coast: in Penang, in the Taiping hills, and on G. Bubu, in the Main range from G. Bujong Malaka to Ginting Bidai east of Kuala Lumpur. It was collected in fruit on G. Ulu Semangkok (8883).

Maba perakensis, King & Gamble, Mat., 74, pt. 2, p. 205. A small tree, recorded only from Perak (no exact locality). At Fraser Hill about 30 ft. high, with blackish bark and small fruits (7855).

***Maba* sp.** A small tree, resembling the preceding, apparently hitherto undescribed (7851).

STYRACEAE.

Symplocos ophirensis, C. B. Clarke: King & Gamble, Mat., 74, pt. 2, p. 246. A bush, endemic and montane, occurring on G. Babu on the Main range from the Semangkok pass southwards to G. Mengkuang lebar between 3800 and 5000 ft., and on Mt. Ophir. We found it at the Trigonometrical station immediately south-east of the Gap of the Semangkok pass in fruit (8873). Its flowers have been obtained in December and May-June on Mt. Ophir; in January-February on G. Mengkuang lebar; and in August-September in the Semangkok pass.

Symplocos rubiginosa, Wall.: King & Gamble Mat., 74, pt. 2, p. 247; Merrill, p. 488. A tree, distributed in the interior of western Malaya,—in Sumatra, in the Peninsula and in Borneo. In the Peninsula it occurs in the hilly districts in the north, but descends to the sea-level in the south. It was found in fruit at 4000 ft. (8597).

Symplocos sp. A species of this genus near *S. perakensis*, King & Gamble, was found about Fraser Hill (7780, 8611). It differs from *S. perakensis* in the calyx and in the presence of teeth along the leaf margin.

OLEACEAE.

Jasminum Griffithii, C. B. Clarke: King & Gamble, Mat., 74, pt. 2, p. 257. A woody climber, endemic, occurring from Penang, down to Singapore upon the west side of the Peninsula, and now found in the Main range at Fraser Hill in fruit (7817).

Jasminum Scortechinii, King & Gamble, Mat., 74, pt. 2, p. 264. A woody climber endemic and montane, occurring on the crest of the hills in Penang, on the Taiping hills from 1500 to 1000 ft., and now recorded from Fraser Hill where it is plentiful, but it was not seen in the direction of Pine-tree hill, where the land rises above 1300 ft. It was in flower (8103), its flowers very fragrant, and also, but rarely, in fruit (8951).

APOCYNACEAE.

Alyxia pumila, Hook. f.: Gamble, Mat., 74, pt. 2, p. 420. A climber, thick leaved, endemic, occurring in the Main range from G. Bujong Malaka to the Semangkok pass and perhaps on Mt. Ophir, found in flower at Fraser Hill (8566, 8575), and at the Trigonometrical station immediately above the Gap on its south-east side (8871).

Alyxia Forbesii, King & Gamble: Gamble, Mat., 74, pt. 2, p. 420. A climber occurring in Sumatra and in the Malay Peninsula and in Java; montane, in Penang (formerly, but perhaps no longer) on the Taiping hills, on the Main range from the mountains of Telom to G. Mengkuang lebar, on Benom, and on G. Pulai in Johore. It was obtained at Fraser Hill at 4300 ft. (7839).

ASCLEPIADACEAE.

Dischidia astephana, Scortechini: Gamble, Mat., 74, pt. 2, p. 582. A herbaceous epiphyte, endemic, and montane, occurring in the Taiping hills from 3600 ft. upwards, on G. Tahan, on the main range from G. Bujong Malaka to Bukit Etam, on Benom, and lastly in Ulu Kuantan at a fairly low level. It occurs at Fraser Hill and forward to the summit of Pine-tree hill at 4800 ft. (8530) in flower and in fruit.

Dischidia albida, Griff.: Gamble, Mat., 74, pt. 2, p. 588. A herbaceous epiphyte, endemic, occurring on the Taiping hills, on G. Tahan, on the Main range from G. Batu puteh to the Semangkok pass, on Mt. Ophir and on G. Pulai. It was got near Pine-tree hill at 1600 ft. (8643) carrying its greenish white flowers.

Dischidia Scortechinii, Gamble, Mat., 74, pt. 2, p. 592. A herbaceous epiphyte, endemic and assuredly montane, but the locality whence the type came is unrecorded. We obtained it at Fraser Hill (8411) bearing its creamy white flowers.

Dischidia rosea, Ridl., in Jour. St. Br. Roy. As. Soc., 61, p. 31. A herbaceous epiphyte, endemic and local: the type came from the neighbourhood of Fraser Hill, where we found it carrying its pretty rose-pink flowers (8652).

LOGANIACEAE.

Fagraea oblonga, King & Gamble; King, Mat., 74, pt. 2, p. 612. A woody epiphyte, endemic and montane, distributed in the Taiping hills, and on the Main range from the mountains of Telom to the Semangkok pass. It was obtained at Fraser Hill in fruit (7861).

Fagraea sp. A shrub in half-ripe fruit, differing from the only specimen of *F. lanceolata* Blume, which we have seen, in having more mucronate leaves. *F. lanceolata* occurs in the Malay Peninsula only in Perak; and it is in Java. The Fraser Hill specimens bear the no. 7821.

Strychnos Scortechinii, A. W. Hill in Kew Bull. 1917, p. 168. A woody climber, endemic and montane, or submontane; it occurs under the west slope of the Taiping hills, and under the west slope of the Main range in Perak and Selangor as far south as Kuala Lumpur. We obtained it in the Valley at Fraser Hill (8675) carrying its grey-green fruits.

Gaertnera intermedia, Ridl. in Jour. F. M. S. Mus. VI, p. 163. A shrub, endemic and montane, quite local: the type came from the Semangkok pass, and we found it in flower and in fruit at Fraser Hill and forward to Pine-tree hill (7823, 8608, 8521, 8864 and s.n.) in flower and in fruit.

Gaertnera Koenigii, Wight: King, Mat., 74, pt. 2, p. 623: Koorders, 3, p. 276. A large shrub, with a broken distribution, in

Ceylon, where it is very common from sea-level up to 3000 ft., and in the Malay Peninsula on Kedah peak, on the Taiping hills, on the Main range from G. Kerbau and the mountains of Telom to G. Mengkuang lebar: it was obtained a century ago in Singapore. C. B. Clarke, who of Malayan material had the Singapore specimen alone before him named it as a variety *oryphylla* in Sir Joseph Hooker's Flora of British India 4, p. 91. Koorders states that its record for Java is an error. The flowers are very fragrant (8552. 8579).

BORAGINACEAE.

Tournefortia Wallichii, D. C.: King, Mat., 74, pt. 2, p. 280: A half-woody herb, occurring in the Nicobars, and in the Malay Peninsula from Lower Siam down to Singapore, in Sumatra and perhaps also in Java: found below Fraser Hill in the mined area of the upper Tras valley (7862), in flower.

CONVOLVULACEAE.

Lettsomia adpressa, Miq.: Prain, Mat., 74, pt. 2, p. 324. A woody climber, endemic, occurring in the lowlands of the Peninsula from Penang to Malacca; and found at the Gap in the Semangkok pass by the roadside as if a recent intruder, in flower (8884).

Lettsomia penangiana, Miq.: Prain, Mat., 74, pt. 2, p. 325. A woody climbing endemic, montane and submontane in the Peninsula, occurring in Penang to the crests of the hills, in the Taiping hills up to 4000 ft., and now found on the Main range at Fraser Hill up to 4000 ft. (7770, 8629). It carried its flowers and its magenta fruit, and occurred in cleared places.

SOLANACEAE.

Solanum nigrum, Linn.: Prain, Mat., 74, pt. 2, p. 329. Koorders, 3, p. 164. A herb, pantropic and extending into temperate countries all round the World. In the Peninsula scattered chiefly about the more cultivated regions. It is not yet recorded as present in Borneo. At Fraser Hill and in the mined area of the upper Tras valley it occurs plentifully, and was both in flower and in fruit.

Solanum verbascifolium, Linn.: Prain, Mat., 74, pt. 2, p. 329: Koorders, 3, p. 165: Merrill, p. 522. A half-woody herbaceous shrub, pantropic. In the Peninsula here and there throughout the more cultivated regions. At Fraser Hill a result of the interference of man, and plentiful in the old mines.

SCROPHULARIACEAE.

Scoparia dulcis, Linn.: Prain, Mat., 74, pt. 2, p. 362: Koorders, 3, p. 180: Merrill, p. 525. An American herb rapidly be-

coming pantropic: in the Peninsula not uncommon in the lowlands, where most settled. At Fraser Hill found by the old dam which is at 4100 ft.

GESNERACEAE.

Cyrtandra pilosa, Blume: Ridley, Mat., 74, pt. 2, p. 791. Koorders, 3, p. 200. A herb about 3 ft. high, occurring in Tenasserim, Sumatra the Malay Peninsula and in west Java. In the Peninsula found in Penang, on the Taiping hills, on the Main range from the neighbourhood of the Semangkok pass to Bukit Sutu in Negri-Sembilan, and on G. Pantai and G. Pulai in Johore. At Fraser Hill it occurs not as a shrub as described in the Flora of British India, but as a half-woody herb about 3 ft. high: and is found in gullies by water: it was in flower and with half ripe fruit (7890, 8615, 8950).

Agalmylea staminea, Blume: Ridley, Mat., 74, pt. 2, p. 738: Koorders, 3, p. 195. A beautiful epiphytic herb, distributed from Sumatra, into the Malay Peninsula and in west and mid Java. In the Peninsula it occurs from 1000 to 3500 ft. on the Taiping hills, and on the Main range it occurs from G. Kerbau, and G. Bujong Malaka to the Semangkok pass. Its elevation in Java is from 4300 to 5000 ft. At Fraser Hill it is common, but it was rarely in flower (8587).

Aeschynanthus perakensis, Ridl.: Ridley, Mat., 74, pt. 2, p. 734. An epiphyte and also on rocks, herbaceous, endemic, occurring on the Taiping hills and on the Main range from G. Kerbau and the mountains of Telom to the Semangkok pass. It was found by us at Fraser Hill (7888) and in the upper Tras valley at 3600 ft. (8859) in flower.

Aeschynanthus longicalyx, Ridl.: Ridley, Mat., 74, pt. 2, p. 735. A beautiful herbaceous epiphyte, endemic and confined to the Main range from G. Kerbau and the mountains of Telom to G. Mengkuang lebar. It occurs at Fraser Hill (Hose 46) and was found by us at Pine-tree hill (8531) in flower.

Aeschynanthus lobbiana, Hook.: Ridley, Mat., 74, pt. 2, p. 735: Koorders, 3, p. 194: *Trichosporum lobbianum*, O. Kze. Merrill p. 550. An epiphyte, herbaceous, distributed in the interior of western Malaysia, Sumatra, the Peninsula, and Borneo, and recorded as occurring in Java, but the record is not properly authenticated. In the Peninsula on G. Raya in Lankawi, on Kedah peak, on the Taiping hills: on the Main range from G. Kerbau to the neighbourhood of Kuala Lumpur, on Mt. Ophir, and on G. Pulai in Johore, also on the east coast from Kuantan and down to Singapore and at a low level at Ayer Panas in Malacca. It was in flower on Pine-tree hill (8549), its flowers very large.

***Aeschynanthus* sp.** A common epiphyte about Fraser Hill found in flower (8418 and s.n.) and appearing to be a species new to the Peninsula.

Cyrtandromoea megaphylla, Hemsl.: Ridley, Mat., 74, pt. 2, p. 788. A rather coarse herb, endemic, found on Kedah peak, on the Taiping hills, on the Main range from the mountains of Telom to Ginting Peras in Selangor. It was found, 4-5 ft. high at Fraser Hill on cleared ground at 4100 ft. (8560) carrying its large white flowers well under the leaves.

Didymocarpus flavescens, Ridl.: Ridley, Mat., 74, pt. 2, p. 749. A herb, endemic and local, occurring only about the Semangkok pass, and once collected under it near Kuala Kubu. It was both in bud and in fruit (8637).

Didymocarpus sp., intermediate between *D. flavescens* and *D. hirta*, with the leaves of the former and the large flowers of the latter was collected (8440).

Didymocarpus crinita, Ridl.: Ridley, Mat., 74, pt. 2, p. 748: A herb relatively tall among the Didymocarps, endemic and local, known only from the neighbourhood of the Semangkok pass. It was plentiful and in flower (8404, 8572, 8580, 8670) at Fraser Hill.

Didymocarpus malayana, Hook.: Ridley, Mat., 74, pt. 2, p. 752. A herb with beautiful yellow flowers, endemic, and apparently confined to the Main range, whereon it occurs from G. Kerbau and G. Bujong Malaka to Ginting Bidai. It occurs in some abundance about Fraser Hill and was in flower and rarely in fruit (8640).

Didymocarpus platypus, C. B. Clarke: Ridley, Mat., 74, pt. 2, p. 757: A white-flowered herb, distributed in Sumatra and the Malay Peninsula. In the Main range it occurs from G. Batu Puteh southwards to G. Augsi, descending the slopes to quite low levels, and in the south of the peninsula it reaches sea-level at Singapore. It was not easily found at Fraser Hill, but carried flowers (8919).

Didymocarpus quinquevulnera, Ridl.: Ridley, Mat., 74, pt. 2, p. 758. A rather untidy herb with a very pretty flower, endemic, occurring on G. Taban, and upon the Main range from G. Kerbau to the neighbourhood of Kuala Lumpur where it descends to quite low levels. About Fraser Hill it was at the time of our visit the most evident of the Didymocarps upon the slopes of the ridges, generally with violet flowers, the throat white (8610), but sometimes with white flowers (8611).

Didymocarpus crinita, Ridl.: Ridley, Mat., 74, pt. 2, p. 748: Merrill, p. 527. A herb, montane and submontane in the Peninsula, extending to Borneo. In the Peninsula occurring on Kedah peak, on the Penang hills, on the Taiping hills, on the Main range from G. Kerbau and near Tapah to Bukit Tangga near Seremban and down the slopes on the west side almost to the base, at Temerloh in Pahang and on G. Pulau in Johore. At Fraser Hill it is common in the variety *Curtisii*, and carried deep violet flowers (8563, 8652).

Didymocarpus venusta, Ridl.: Ridley, Mat., 74, pt. 2, p. 760. A pretty white flowered herb, endemic and montane, restricted to the Main range from G. Bujong Malaka and the mountains of Telom to the Semangkok pass. It was just coming into flower at 1300 ft. (7891) in damp places at Fraser Hill.

Didymocarpus pumila, Ridl.: Ridley, Mat., 74, pt. 2 p. 763. A small herb, with a pretty deep violet flower, which is endemic and local. It was described from the Semangkok pass and occurs at Fraser Hill on one of the vein-quartz ridges (8657). It was in flower and in fruit.

ACANTHACEAE.

Thunbergia alata, Sims: C. B. Clarke, Mat., 74, pt. 2, p. 632; Koorders, 3, p. 213; Merrill, p. 538. An african herbaceous climber, which is gradually becoming pantropic: in the Peninsula as yet only in a few places. It occurs on the roadside near the Gap.

Staurogyne subglabra, C. B. Clarke, Mat., 74, pt 2, p. 640. A half woody herb, endemic, found on Kedah peak, on the Taiping hills and on the Main range from the mountains of Telom to the Semangkok pass. We found it in the valley at Fraser Hill in flower (7781).

Strobilanthes hirtisepalus, C. B. Clarke, Mat., 74, pt. 2, p. 656. A weak shrub, endemic, occurring on Kedah peak, on the Taiping hills and on the Main range in the mountains of Telom. We found what is believed to be it, flowerless, at Fraser Hill in forest (8616).

Filetia hirta, Ridl. in Jour. Str. Br. Roy. As. Soc. 61, p. 35. A creeping herb, endemic and local found only upon the Main range in the neighbourhood of the Semangkok pass. It is quite common at Fraser Hill with lemon yellow flowers (8408, 8576) or with salmon yellow flowers (8577). The Hon'ble Mr. G. Hose obtained it in flower in July, and Mr. Ridley in August.

Filetia paniculata, C. B. Clarke Mat., 74, pt. 2, p. 670. A tall herb, endemic, and of restricted distribution upon the Main range, having been collected by Scortechini at some unrecorded part of Perak, and by Ridley near the Semangkok pass. It was found by us 6 ft. high in forest at Fraser Hill (8601) with pale yellow flowers.

Justicia subalternans, C. B. Clarke, Mat., 74, pt. 2, p. 685. A herb, endemic and local, described from specimens collected about the foot of the Main range in Perak. The specimens from Fraser Hill diverge slightly, and therefore some doubt exists as to the determination of our specimens: they bear the number 8441. They carried pale yellow flowers and a few fruits.

VERBENACEAE.

Vitex gamosepala, Griff.: Gamble, Mat., 74, pt. 2, p. 855. Merrill, p. 514. A small tree occurring in Sumatra, the Malay

Peninsula and Borneo: in the Peninsula it is mostly submontane: it is found from Lower Siam (Tomoh) to Singapore down both sides of the Peninsula: how far it ascends the hills is not yet to be recorded. It was found at Fraser Hill upon the edge of forest: but would scarcely owe its presence in the station to the clearing by man (7793), in flower.

Clerodendron deflexum, Wall.: Gamble Mat., 74, pt. 2, p. 828. A small shrub, in distribution endemic, in the north of the Peninsula montane or submontane, but descending low in the south: it occurs on Kedah peak at 1500 and 3500 ft., on the Penang hills from 500 ft. upwards: on the Taiping hills, on G. Tahan on the Main range from the mountains of Telom to the neighbourhood of Kuala Lumpur, on Benom, in Malacca, Johore and Singapore as well as on the coast of Pahang. At Fraser Hill in flower (7819).

Clerodendron diversifolium, Blume: Gamble, Mat., 74, pt. 2, p. 829: Koorders, 3, p. 137: Merrill, p. 516. A shrub, distributed through western Malaysia, Sumatra, the Peninsula, Java, and Borneo. In the Peninsula throughout at low levels, and on the mountains, though little observed. It was found not uncommonly ascending to 4300 ft. at Fraser Hill, in flower (7782).

Clerodendron paniculatum, Linn.: Gamble, Mat., 74, pt. 2, p. 838. A tall herb extending from Siam through the low country of the Malay Peninsula to Singapore, found under Fraser Hill in the upper Tras valley at about 3300 ft. (8861).

LABIATAE.

Hyptis brevipes, Port.: Prain, Mat., 74, pt. 2, p. 704: Koorders, 3, p. 153: Merrill, p. 520. A herb of American origin, now pantropic, found in the more thickly populated parts of the lowlands of the Peninsula, and occurring at 3300 ft. under Fraser Hill in the direction of the Gap by new buildings (7773) in fruit.

Gomphostemma sp. near *G. oblongum* Wall., but with a white corolla, was found at Fraser Hill in deep shade (8650).

PLANTAGINACEAE.

Plantago major, Linn.: Prain Mat., 74, pt. 2, p. 727: Koorders, 3, p. 231: Merrill, p. 543. A herb, common round the World in temperate countries, and invading the tropics with the help of man, persisting with a little encouragement about villages even in Singapore island. At Fraser Hill observed at 4100 ft. and under Fraser Hill in the mine area of the upper Tras valley.

AMARANTACEAE.

Amaranthus viridis, Linn.: Gamble, Mat., 75, p. 11: Koorders 2, p. 197: Merrill, p. 246. A pantropic herbaceous weed, frequent through the Malay Peninsula, and found under Fraser Hill at 3300 ft. in flower and fruit, by new buildings.

POLYGONACEAE.

Polygonum chinense, Linn., Gamble, Mat., 75, p. 22: Koorlers, 2, p. 181: Merrill, p. 215. A herb occurring on the mountains of southern India and Ceylon; in the Himalaya and through China to Japan, southwards through Burma and Siam to Malaysia, where it occurs in Sumatra, the Peninsula, Borneo, Java, Timor, and the Philippines. It occurs throughout Java both high and low: in the Peninsula it is montane but descends cool mountain streams to the edge of the low country along the Main range from G. Kerbau and the mountains of Telom to the Semangkok pass. At Fraser Hill it is common near the old mines, and newer clearings, (8421), and about the old mines in the upper Tras valley.

NEPENTHACEAE.

Nepenthes sanguinea, Lindl.: Macfarlane, Mat., 75, p. 283: Merrill, p. 285. A half woody climber, occurring in the Peninsula and in Borneo: in the Peninsula found on the Taiping hills and G. Bubu, on G. Tahan, on the Main range from G. Bujong Malaka and the mountains of Telom to Bukit Elam, on Benom and on Mt. Ophir. At Fraser Hill it is by no means uncommon from below at 3500 ft. almost to the summit of Pine-tree hill at 4800 ft. It was in flower and in fruit at 4200 ft. (8630), but not below (7878).

PIPERACEAE.

Piper stylosum, Miq.: C. de Candolle, Mat., 75, p. 302: Merrill, p. 209. A herb, extending through the interior of western Malaysia,—Sumatra, the Malay Peninsula and Borneo. In the Peninsula it is chiefly montane, occurring in the Taiping hills, on G. Tahan, on the Main range from G. Bujong Malaka, and the mountains of Telom to G. Tampin; and at low levels elsewhere particularly in Selangor, and Johore and on P. Tioman. It is common at Fraser Hill (8139), carrying its white flowers.

Piper semangkoanum, C. de Candolle, Mat., 75, p. 304. A herb, endemic and restricted to the Taiping hills, and the neighbourhood of the Semangkok pass: however on G. Tahan there is a closely allied plant (Md. Haniff & Md. Nur, 8150). At Fraser Hill it occurs sporadic in the forest (8438, 8544), and carried white flowers as well as nearly ripe fruit.

MYRISTICACEAE.

Horsfieldia lemanniana, Warb.: Gamble, Mat., 75, p. 219. A tree, endemic, found chiefly in the lowlands of the west side of the Peninsula but recorded from the Taiping hills, and the lower slopes of the Main range in Perak. It was found at Fraser Hill as a small tree branching like a *Garcinia*, i.e. with long stiff side branches, and was in fruit (8679).

LAURACEAE.

Dehaasia? A rather tall tree in fruit with leaves 9×3.5 cm. which dry brown (7833), at Fraser Hill.

Cinnamomum rhynchophyllum, Miq.: Gamble, Mat., 75, p. 78. A small tree, occurring in Sumatra and locally in the Malay Peninsula, submontane as in Larut and at Tapah in Perak. This tree, up to 20 ft. high, is plentiful at Fraser Hill: it has been identified from descriptions. It smells strongly of camphor, and carried flowers and young fruit (7758, 8447, 8801).

Cinnamomum mollissimum, Hook. f.: Gamble Mat., 75, p. 82. A tree, endemic, occurring in Penang, on the Taiping hills, on G. Tahan and down the Main range from near Gopeng to Negri Sembilan. At Fraser Hill it occurred as a big tree, with remarkably fragrant bark and white wood (8700), sterile.

Cinnamomum aureofulvum, Gamble, Mat., 75, p. 84. A small tree, endemic and strictly local. It occurs at Fraser Hill on one of the vein-quartz ridges (8940), being sterile in September; it was collected in 1904 by Mr. Ridley on G. Ulu Semangkok; and a somewhat similar plant has been obtained on G. Ulu Kali, a mountain which is again a little further south.

Phoebe cuneata, Blume: Gamble Mat., 75, p. 109: Koorders, 2, p. 265. A tree occurring in the Malay Peninsula and in west Java; found in the Peninsula in the lowlands from Province Wellesley to Singapore, but montane also, as it has been obtained at 4100 ft. on the Taiping hills, and on the Main range at G. Batu puteh. Our Fraser Hill specimens were got with fruit at 4200 ft. (7807), and not altogether agreeing with the lowland plant may prove when the flower is collected to differ. The fruit is green and its pedicel red.

Litsea citrata, Blume: Gamble, Mat., 75, p. 146: Koorders, 2, p. 272: Merrill, p. 376. A small tree widely distributed from the Himalaya and southern China to Malaysia, where it is in Sumatra, the Peninsula, Borneo and Java. In the Peninsula it is montane occurring on the Taiping hills and on the Main range from the mountains of Telom to the Semangkok pass. On the Taiping hills it occurs at 3000 ft. About Fraser Hill it is common on cleared ground and was found in flower at 4000 ft. (s.n.); and it occurs about the old mines in the upper Tras valley. Its white flowers are fragrant. Its smooth green bark is characteristic. It appears suitable for sowing on elevated abandoned mine-areas.

Litsea penangiana, Hook. f.: Gamble, Mat., 75, p. 154. A small tree, and montane, occurring in Sumatra and on the crest of the hills in Penang, on G. Bubu, and on the Main range from G. Batu puteh down to the neighbourhood of Kuala Lumpur where it descends to a low level. At Fraser Hill it is common and was in flower and with half ripe fruit (7804, 8448, 8699).

Litsea castanea, Hook. f.: Gamble, Mat., 75, p. 155. A bush or small tree, endemic, occurring in the low country from Larut through Selangor to Malacca; and now found at 4200 ft. at Fraser Hill (7881).

Litsea machilifolia, Gamble, Mat., 75, p. 171. A small tree, endemic, montane or submontane, occurring on the Penang hills at 1000 ft., on the Taiping hills down to the base, on the Main range from G. Batu Puteh to G. Tampin, and in the low country of Malacca and on to Singapore. At Fraser Hill it is common in the forest right to the tops of the hills at 4300 ft., carrying flowers and more commonly its large marble-like green fruits on swollen orange pedicels (7784, 8667, 8809).

***Litsea* sp.** A tree of 60 ft. in height, with some affinity to *L. cordata*, Hook. f., the leaves measuring up to 18 x 9 cm., at Fraser Hill in fruit (7762).

***Litsea* sp.** A small tree in flower and in fruit with leaves measuring up to 11 x 4 cm., at Fraser Hill (s.n.).

***Litsea* sp.** A small tree with harsh leaves measuring up to 14 x 6 cm. in flower on a vein-quartz ridge (8931).

Lindera malaccensis, Hook. f.: Gamble, Mat., 75, p. 194: Merrill, p. 297. A small tree distributed from the Malay Peninsula to Borneo. In the Peninsula from the Larut plains to Singapore at low levels: and this is the first record of its occurrence at some elevation. It was got at 4200 ft. (8689).

Lindera Wrayii, Gamble, Mat., 75, p. 196. A bush, endemic, and in the Peninsula confined to the Taiping hills, and the Main range from the mountains of Telom to the Semangkok pass. We found it as a bush up to 10 ft. in height, both in flower and with fruit (8565, 8569, 8612), and again on G. Ulu Semangkok (8779).

Lindera caesia, Boerl.: Gamble, Mat., 75, p. 200: Merrill, p. 279. A small tree found in the Malay Peninsula, Borneo and Java. In the Peninsula it occurs on the Taiping hills, on G. Tahan, in the Main range near the Semangkok pass and south to G. Mengkuang lebar, its limits being as far as known 3000 and 5000 ft. It was found at Fraser Hill just inside the edge of a gully, in flower (7881) and again in fruit (7769).

Lindera? A tree (7837), found at 4200 ft. appears also to be another species of *Lindera*.

Lindera? A tree 80 ft. high, and 60 ft. to the first branch was found at 4200 ft. with fruit going pink, which is thought to be a *Lindera* (7857).

CHLORANTHACEAE.

Chloranthus officinalis, Blume: Gamble, Mat., 75, p. 33: Koorders, 2, p. 10: Merrill, p. 209. A half-wooded herb, distributed

from the eastern Himalaya and south-western China southwards through Burma the Andamans, and through Malaysia to the Philippines and New Guinea: in Java it occurs from 900 ft. to 6000 ft. In the Peninsula it is found in the lowlands in Penang and elsewhere, and is on the Main range. Below Fraser Hill it was found at 3500 ft. towards the Gap in fruit (7772).

Chloranthus brachystachys, Blume: Gamble, Mat., 75, p. 34: Koorders, 2, p. 41: Merrill, p. 209. A half-woody plant, rather more montane than *C. officinalis*, distributed from southern India and Ceylon and from Japan and the mountains of Assam, southwards through Burma to Malaysia where it occurs in Sumatra the Peninsula, Lingga, west and mid Java and north Borneo. In the Peninsula it is found in Penang, and on the Main range from the mountains of Telom and G. Bujong Malaka to the Semangkong pass. At Fraser Hill it is common and we found it also at the Trigonometrical Station immediately over the Gap on the south-east side (8889) carrying its yellow unripe and red ripe berries.

THYMELAEACEAE

Daphne composita, Gilg: Gamble, Mat., 75, p. 257: Koorders, 2, p. 657. A small shrub, found in Burma, Sumatra, the Malay Peninsula and Java. In the Peninsula it is montane, occurring in the Taiping hills, and the Main range from G. Bujong Malaka to Bukit Kutu. It was found at Fraser Hill (s.n.) in flower.

Wikstroemia candolleana, Meissn.: Gamble, Mat., 75, p. 259: W. *indica*, Mey. Koorders, 2, p. 656. A small shrub distributed in the Malay Peninsula, through Java and in Madura in an unusual way. In the Peninsula it occurs on Kedah peak, the Taiping hills, G. Tahan and G. Bubu (as a variety), the Main range from the mountains of Telom to G. Mengkuang lebar, and on Benom. At Fraser Hill it was found in flower (8932) on the poor soil of one of the vein-quartz ridges.

LORANTHACEAE.

Loranthus pentapetalus, Roxb.: Gamble, Mat., 75, p. 355: Koorders, 2, p. 158: Merrill, p. 259. A woody parasite, distributed from the eastern Himalaya through Burma and Siam to Sumatra, the Malay Peninsula, Borneo, Java and the Philippines. In the Peninsula it occurs at low levels; and the records for the mountains are few: it has, however, been collected on G. Batu puteh at 4000 ft. It was in flower at 4200 ft. at Fraser Hill (7813).

Loranthus coccineus, Jack: Gamble, Mat., 75, p. 356: Merrill, p. 236. A woody parasite, distributed from north-eastern India through Burma, in the Andaman islands, the Malay Peninsula, Banca and Borneo. In the Peninsula it is fairly general at low levels, and on the lower slopes of the mountains; but its

discovery at Fraser Hill adds greatly to the altitude at which it is known to occur. It was parasitic upon a *Maesa* and in flower

Loranthus Lobbii, Hook. f.: Gamble, Mat., 75, p. 358. A woody parasite, endemic and not uncommon in the Peninsula at low levels and up to 1000 ft. It has been collected from Kedah peak, Penang, the Taiping hills, on G. Tahan, the Main chain from Perak to G. Mengkuang lebar. It has been said to occur also in Borneo, but apparently in error. It was obtained at Fraser Hill in flower (8687).

Elytranthe formosa, Don: Gamble, Mat., 75, p. 372: Koorders, 2, p. 164. A woody parasite, distributed from Tenasserim, south through the Peninsula, and to west Java. In the Peninsula it is montane and restricted to the Main range from G. Bujong Malaka and G. Batu puteh to G. Mengkuang lebar, and also it has been obtained at Temerloh in Pahang. At Fraser Hill it was upon an undetermined tree at 1200 ft. (8925) coming into flower, and also at Pine-tree hill.

Elytranthe globosa, G. Don: Gamble, Mat., 75, p. 377: Koorders, 2, p. 164. A woody parasite on various trees, distributed from the central Himalaya through Burma, to the Malay Peninsula and to Java. In the Peninsula it is a lowland plant from the north down to Singapore, and this is its first record for the mountains. It was found at Fraser Hill (s.n.) at 4200 ft.

Lepeostegeres Kingii, Gamble, Mat., 75, p. 382. A woody parasite occurring in the Malay Peninsula and Borneo: in the north of the Peninsula montane, in the south descending to sea-level: the mountains upon which it occurs are Kedah peak, the Taiping hills, G. Tahan, the Main range from Ulu Batang Padang to Fraser Hill, Bukit Sedanan in Malacca which just attains 1000 ft., and then in southern Johore it is down near the coast. At Fraser Hill we found it exceedingly common, its very large flowers littering the paths, tattered by birds hunting honey (8692).

SANTALACEAE,

Henslowia buxifolia, Blume: Gamble, Mat., 75, p. 274: Merrill, p. 241. A woody parasite found in the Peninsula, Banca and Borneo: in the Peninsula at low elevations from Perlis and Penang to Singapore and on the mountains of Kedah peak, the Main range at Fraser Hill, Benom and Mt. Ophir. We found it in flower (7812) at 4300 ft.

Henslowia sp. A woody climber with leaves broadly elliptic, 5.5 x 3.5 cm., of the affinity of *H. Ridleyi*, Gamble, but not it, was got on a vein-quartz ridge at Fraser Hill (8923).

BALANOPHORACEAE.

Balanophora multibracteata, Fawcett: Gamble, Mat., 75, p. 397. A herbaceous parasite occurring in Sumatra and in the Malay Peninsula. In the Peninsula occurring in the Taiping hills and in the Main range from the mountains of Telom to the Semangkok pass. At Fraser Hill it is frequent and was newly in flower: it was traced to the roots of a big woody climber thought to be a Rubiaceae (7786).

EUPHORBIACEAE.

Glochidion sericeum, Hook. f., Fl. Brit. Ind. V. p. 326. Koorders, 2, p. 473; Merrill, p. 329. A shrub, distributed in Sumatra, down the Malay Peninsula, in Banca, western Java and Borneo: in the Peninsula it is a lowland plant from Perak and Penang to Singapore on both sides of the Peninsula, and ascending the mountains to some extent. At Fraser Hill it was found on a clearing at 4200 ft. (8911). This is higher than its record for Java of 3700 ft.

Glochidion coronatum, Hook. f., Fl. Brit. Ind. V. p. 326. A shrub occurring in Tenasserim and southwards to Singapore mostly at low elevations but collected along the Main range. At Fraser Hill it carried its pink fruits (8854).

Breynia coronata, Hook. f., Fl. Brit. Ind. V. p. 330. A small tree, endemic, found in Perak first at Ulu Bubong and now got at Fraser Hill in a clearing (7715).

Baccaurea bracteata, Muell.-Arg.: Hook. f., Fl. Brit. Ind. V. p. 372; Merrill, p. 330. A tree distributed in western Malaysia from Sumatra into the Malay Peninsula and to Borneo: in the Peninsula at low elevations in Perak, Pahang and Negri Sembilan: found flowerless at Fraser Hill (7883) and the identification consequently doubtful. The Malays called it Taban burong or bird's gutta-percha.

Antidesma velutinosum, Bl.: Hook. Fl. Brit. Ind. 5, p. 356. A large bush with claret fruits found between Fraser Hill and Pine-tree hill (8515) and again with flowers on G. Ulu Semangkok (8878).

Antidesma fallax, Muell.-Arg.; Hook. f., Fl. Brit. Ind. V, p. 359. A shrub 20 ft. high, endemic, occurring freely at low elevations, submontanely from Lower Siam (Kantang) to Singapore, and ascending the mountains, at any rate the Main range, whereon it has been got on G. Mengkuang lebar at 5000 ft. It occurs at Fraser Hill as a bush up to 4200 ft. (8655).

Macaranga Hullettii, King: Hook. f., Fl. Brit. Ind. V. p. 452: A very quick-growing tree, endemic, occurring down the west side of the Peninsula in swamps and swampy forest, from Perak to Malacca, and now found to be common on Fraser Hill in forest

at 4000 to 4300 ft. (8518): and what is most interesting, it regenerates itself in the one hundred feet high forest. These Fraser Hill specimens have unusually large leaves.

Macaranga puncticulata, Gage. A tree at Fraser Hill up to 50 ft. in height and on Pine-tree hill up to 15 ft. in height, is common in the forest where it is able to regenerate and was in fruit (8522, 8658).

Homalanthus populneus, Pav.: Koorders, 2, 506: Merrill, p. 347. *Homalanthus populifolius*, Grah.: Hook. f., Fl. Brit. Ind. V, p. 469. A shrub, distributed from Ceylon (possibly wrong) in Sumatra, the Malay Peninsula, Java, Borneo, Celebes, the Philippines and to north Australia: in the Peninsula occurring in the lowlands from Penang to Selangor, and in Pahang including P. Tiuman. It is in the mountains of Telom: and is common at Fraser Hill, as well as in cleared mine land below it.

ULMACEAE.

Trema orientalis, Blume: Hook. f., Fl. Brit. Ind. 5, p. 484; Koorders, 2, p. 77: Merrill, p. 217. A small tree, widely distributed from India both north and south and from China to Sumatra, the Malay Peninsula, Java, Borneo, and other islands of Malaya and to Australia and the Pacific, quick to take advantage of the clearings of man, and in the Peninsula wide. At Fraser Hill it occurred near the houses, both in the type (s.n.), and (8632) in the variety *amboinensis*. (*T. amboinensis*, Blume: Hook. f., Fl. Brit. Ind. 5, p. 484).

MORACEAE.*

Ficus rostrata, Lamk.: Hook. f., Fl. Brit. Ind. 5, p. 520: Koorders, 2, p. 110: Merrill, p. 227. A small shrub, distributed from the eastern Himalaya through Burma to the Malay Peninsula, Borneo, Java: and found at Fraser Hill in exposed places, carrying small bright red figs (8599).

Ficus pedunculosa, Miq., reaching ten feet in height with reddish figs (8802) at Fraser Hill.

Ficus diversifolia, Blume: Hook. f., Fl. Brit. Ind. 5, p. 529: Koorders, 2, p. 116: Merrill, p. 529. A small bush distributed from Sumatra through the Peninsula to Borneo, and Java: in the Peninsula it occurs from low levels up to 5000 ft. and it was found at Fraser Hill as a bush up to 10 ft. high in fruit (8920, 8654).

Ficus Burkillii, Ridl. n. sp. A bush with acute leaves, but otherwise near to *F. diversifolia*, at Fraser Hill (8900) and at Pine-tree hill (8529).

Ficus fistulosa, Reinw.: Hook. Fl. Brit. Ind., 5, p. 525: Koorders, 2, p. 120: Merrill, p. 223. A small tree growing in a gully at Fraser Hill in fruit, and with hollowed stems (7886).

*In consequence of the genus *Ficus* being under revision in Calcutta and the collection belonging to the Singapore Herbarium being on loan the Fraser Hill species cannot be determined fully.

Ficus patens, Ridl., a coarse hairy bush occurring at Fraser Hill in the valley (7776).

Ficus sp. A stiff pubescent bush, with bright red fruits, at Fraser Hill (s.n.).

Ficus fulva, Reinw.: Hook. Fl. Brit. Ind., 5, p. 531: Koorders, 2, p. 117: Merrill, p. 223. A coarse small tree about 20 ft. high with orange to livid figs, in the mined lands of the upper Tras valley about 3500 ft. (7864).

Ficus globosa, Bl.: Hook. Fl. Brit. Ind., 5, p. 503: Koorders, 2, p. 103: Merrill, p. 224. A small tree with big figs, found in the mine area of the upper Tras valley (7872).

Ficus chartacea, Wall.: Hook. Fl. Brit. Ind., 5, p. 533. A bush eight feet high with orange-red figs upon upright branches, at Fraser Hill (7789).

Ficus sp. A pyramidal bush six feet high with brown fruits (8555).

Conocephalus suaveolens, Blume: Hook. f., Fl. Brit. Ind. 5, p. 545: Koorders, 2, p. 122: Merrill, p. 229. A big woody climber, distributed from the eastern Himalaya and Indo-China southwards to Sumatra, the Malay Peninsula, Java, Borneo, and the Philippines: in the Peninsula common widely. At Fraser Hill plentiful.

URTICACEAE.

Pouzolzia viminea, Wedd. Hook. Fl. Brit. Ind., 5, p. 581: Koorders, 2, p. 144: Merrill, p. 233. Shrub about 8 ft. high upon a clearing at 4200 ft. (8948).

JUGLANDACEAE.

Engelhardtia spicata, Blume: Hook. f., Fl. Brit. Ind. V, p. 595: Koorders, 2, p. 51: Merrill, p. 210. A tree, distributed from the central Himalaya, south through Indo-China into the Malay Peninsula, Java, Borneo and to the Philippines. In the Peninsula it is only on the Main range of Perak. At Fraser Hill it is frequent and so also on G. Ulu Semangkok. Ripe fruits were falling.

FAGACEAE.

Quercus sp. near *Q. semiserrata*, Roxb., collected flowerless, a tree about 50 ft. high upon a north slope at Fraser Hill (7753).

Quercus turbinata, Blume: Gamble, Mat., 75, p. 410: Koorders, 2, p. 60. A tree, occurring in Sumatra and in the Malay Peninsula: in the Peninsula found in Penang and on the Main range in Ulu Batang-padang and now at Fraser Hill (8661). It should be collected more for a better understanding.

Quercus cyrtorhyncha, Miq.: Merrill, p. 212: *Pasania cyrtorhyncha*, Gamble, Mat., 75, p. 432. A tree, distributed from Sumatra through the Malay Peninsula and Borneo to Mindanao in the Philippines. In the Peninsula occurring submontanely from

Perak southwards, and to Singapore. At Fraser Hill and below towards the Gap, an oak without flowers and without fruit was found which appears as if this (7783, 7836).

Quercus rassa, Miq.: Koorders, 2, p. 59: Merrill, p. 215: *Pasania Rassa*, Gamble, Mat., 75, p. 436. A tree distributed in western Malaysia from Sumatra, the Malay Peninsula, to west Java and to Borneo. In the Peninsula montane, occurring on Penang, on the Taiping hills, on G. Tahan, on the Main range from Fraser Hill into Negri Sembilan, on Benom, and then at low levels in southern Johore. It reaches 6000 ft. on G. Tahan. At Fraser hill it is common tree (s.n.).

Quercus lucida, Roxb.: *Pasania lucida*, Gamble, Mat., 75, p. 440. A tree, endemic, very common in Penang and extending thence southwards to Singapore, ascending the mountains and recorded as upon G. Batu puteh at 3000 ft. It occurred at Fraser Hill on the ridges, but as the acorns were fallen ones not attached to the parent, there is a trifle of doubt as to the determination (s.n.).

Quercus encleisacarpa, Korth.: *Pasania encleisacarpa*, Gamble, Mat., 75, p. 449. A tree with a wide top and brittle wood, occurring in Sumatra and in the Malay Peninsula: in the Peninsula it occurs at low levels from Penang and Province Wellesley to Singapore. At Fraser Hill it was common in the variety *aperta* (8695).

Quercus beccariana, Benth: Merrill, p. 211: *Pasania beccariana*, Gamble, Mat., 75, p. 453. A tree, with brittle wood, occurring in the Malay Peninsula and in Borneo: in the Peninsula it is said once to have been abundant in Singapore, and it is recorded for Penang. The Fraser Hill specimens have depressed globose acorns (7795) and consequently the identification is somewhat doubtful.

Quercus sp. with very large acorns and cupules covered with processes as in *Q. Wrayi*, found at Fraser Hill (s.n.).

Quercus sp. A tree which was neither in fruit nor in flower (8805).

TAXACEAE.

Dacrydium Beccarii, Parl.: Merrill, p. 30. A small tree occurring in the Malay Peninsula and in Borneo. In the Peninsula it occurs on G. Tahan, on the Main range from G. Bujong Malaka to Pine-tree hill near Fraser Hill (8536), and on Mt. Ophir. On Pine-tree hill it occurs about and on the very top as a tree of 20 ft.

Dacrydium elatum, Wall.: Hook. f., Fl. Brit. Ind., 5, p. 648: Merrill, p. 30. A lofty tree, occurring from Burma and Tonkin to Sumatra, down the Malay Peninsula, in Borneo, the Philippines and in Fiji: in the Peninsula occurring in Penang, on Kedah peak at 3000 ft., on G. Tahan on the Main range in the mountains of Telom, on Mt. Ophir, and on G. Chenik in Pahang. Under Fraser

Hill at about 3400 ft. it occurred as a magnificent tree with a clean straight bole of eighty feet to the first branch, and a total height of one hundred feet and more: it was found also upon G. Ulu Semangkok.

Dacrydium falciforme, Pilger: Merrill, p. 30. A tree, distributed from the Malay Peninsula, in Lingga, through north Borneo to Mindoro in the Philippine islands: in the Peninsula occurring on G. Tahan, and on the Main range in the neighbourhood of the Semangkok pass. It is a most common tree on the vein-quartz ridges of Fraser Hill (8556, 8929), and also elsewhere sometimes sparingly, sometimes in some measure of plenty: ascending above the level of Fraser Hill towards Pine-tree hill: below Fraser Hill it occurs down to 3300 ft. at least and it is on G. Ulu Semangkok. Regeneration appears to be quite free. The Malays call it Kahuwa.

Podocarpus neriifolia, Don.: Hook. f., Fl. Brit. Ind., 5, p. 649: Koorders, 1, p. 65: Merrill, p. 31. A tree, distributed from the Central Himalaya and southern China, to Sumatra, the Malay Peninsula, Borneo, Java, Celebes, the Moluccas, Philippines and to New Guinea. In the Peninsula it occurs as a montane plant in Perang, on G. Tahan as a variety or subspecies, on the Main range from Perak south to Bukit Etam, and on Mt. Ophir. In Java it descends as low as 1200 ft.: but in Penang it exists lower than this. At Fraser Hill it is by no means uncommon (7841, 7856, 8877).

Agathis alba, Foxw.: Koorders, 1, p. 67: Merrill, p. 32: *A. loranthifolia*, Salisb.: Hook. f., Fl. Brit. Ind. 5, p. 650. A lofty tree, distributed in Cochinchina and through the interior of Malaya, in Sumatra, the Malay Peninsula, Borneo, Java, Celebes, the Moluccas, and the Philippines: in the Peninsula on Kedah peak, in Penang, where it is becoming very scarce, on the Taiping hills, on G. Tahan, on the Main range from near the Semangkok pass, and on G. Chenik in Pahang. Under Fraser Hill it was observed no higher than 3300 ft. upon the west side of the waterparting.

BURMANNIACEAE.

Burmattia longifolia, Becc.: Ridl., Mat., Mono., 2, p. 70: Merrill, p. 133. A herb of mossy places, occurring in the Malay Peninsula and through Borneo to the Philippines and New Guinea: in the Peninsula it occurs on the Taiping hills, on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom to Bukit Etam and on Benom. At Fraser Hill it occurs sporadic, but quite plentifully and was going into fruit (8510): it was also found on G. Ulu Semangkok.

ORCHIDACEAE.

Oberonia pendula, Ridl. in Jour. Str. Br. Roy. As. Soc., 61, p. 38. An epiphyte, endemic and local. It was collected from the neighbourhood of Fraser Hill by Mr. Ridley in 1911 where we got it (7825) in flower and in fruit.

Oberonia spathulata, Lindl. J. J. Smith, p. 238. Distribution in Java, Sumatra, Borneo; occurring as an epiphyte at Fraser Hill (8634).

Liparis compressa, Lindl.: Ridl., Mat., Mono., 1, p. 25: J. J. Smith, p. 280; Ames, p. 153. A herbaceous plant, distributed from Sumatra, in the Malay Peninsula, Borneo, Java Celebes and the Philippines: in the Peninsula occurring in the Taiping hills, and on the Main range from G. Batu puteh to Fraser Hill, where it was found in flower (8893).

Liparis purpureoviridis, Ridl. n. sp. A not uncommon terrestrial plant in the forest (8422) with green purple-veined flowers.

Platyclinis odorata, Ridl., Mat., Mono., 1, p. 28. An epiphyte or on rocks, endemic, occurring on G. Bubu, and on the Main range about Fraser Hill on trees (8423) and below in the upper Tras valley at 3500 ft. on rocks in the sun (8853), plentiful and just in flower.

Dendrobium Kelsalli, Ridl., Mat., Mono., 1, p. 36. A herbaceous epiphyte, endemic, occurring on Kedah peak, apparently in Penang, on the Taiping hills, on G. Tahan, on the Main range from Fraser Hill (8690) to Bukit Etam, on Benom and on Mt. Ophir also on P. Aor off the east coast.

Dendrobium flabellum, Reichb. f.: Ridl., Mat., Mono., 1, p. 36. J. J. Smith, p. 315; Ames p. 189. A herbaceous epiphyte, distributed from Siam to Singapore, in Java and in Borneo, but in need of further study, as being apparently a species in process of breaking up. It is an orchid with flowers that are open for a few hours only in accurate response to some climatic phenomenon: and it is evident that an acceleration or retardation of the rapidity with which the stage between the stimulus and the flowering is passed through, stands for the production of new species as inter-crossing is prevented. This seems to be happening: and there seem to be in the Peninsula three subspecies of *D. flabellum*, (1) the plant of Singapore and southern Johore with cream-coloured flowers, the sepals and petals marked with pink spots, the lip cream-coloured with rosy side-lobes (2) the plant of the north with pale green flowers, the sepals and petals spotted with purple, the lip wholly cream and (3) the Fraser Hill plant with the sepals and petals cream-coloured suffused with purple and the lip with the mid-lobe orange. Both the second and the third appeared to have smaller flowers than the first.

Dendrobium atrorubens, Ridl. Mat., Mono. 1, p. 41. A herbaceous epiphyte with a dull cherry-red flower, endemic, found in the Peninsula on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range at Fraser Hill (8672) and on Benom.

Dendrobium hymenopterum, Hook. f.: Ridl. Mat., Mono. 1, p. 52. A herbaceous epiphyte, endemic, on G. Raya in Lankawi, on Kedah peak, on G. Tahan, on the Main range from G. Batu puteh and G. Bujong Malaka to Fraser Hill (8502) and on Benom. It was abundantly in flower.

Dendrobium albicolor, Ridl. in Jour. Linn. Soc. Bot. 32, p. 250. A herbaceous epiphyte, known from Lower Siam (Pungah) and now in a pinkish variety from Fraser Hill (7790).

Dendrobium rupicolum, Ridl. in Jour. F. M. S. Mus. 1, p. 184. A small herbaceous epiphyte, occurring on G. Tahan, on the Main range at Fraser Hill (8516) and southwards on Bukit Etam, and on Benom. It was found in flower.

Dendrobium sp. apparently new, a herbaceous wide creeping hirsute epiphyte of a peculiar appearance (7799).

Dendrobium geminatum, Hook. f.: Ridl. Mat., 1, p. 35: J. J. Smith, 346. An epiphyte and on rocks occurring in the Malay Peninsula and in Java: in the Peninsula found on Kedah peak and on the Taiping hills, on G. Tahan, and on the Main range from Ulu Batu Padang to Fraser Hill (7876). Its flowers are of a dull yellow, marked with purple.

Bulbophyllum patens, Hook. f.: Ridl. Mat., Mono. 1, p. 62. A herbaceous epiphyte, endemic, which may be represented by our no. 7792, which was found in fruit upon an oak at Fraser Hill. Until flowers are forthcoming however its occurrence must be doubtful. *B. patens* is in the Peninsula, at low levels from Penang to Singapore.

Bulbophyllum uniflorum, Hassk.: J. J. Smith, p. 443: *B. galbinum*, Ridl.: Mat., Mono. 1, p. 64. A herbaceous epiphyte, in Sumatra, the Malay Peninsula and west Java: in the Peninsula found in the Taiping hills, on G. Tahan at 3300 ft. and on the Main range from the neighbourhood of the Semangkok pass to Bukit Etam: it was found at Fraser Hill in flower (8504).

Bulbophyllum capitatum, Lindl.: Ridl. Mat., 1, p. 73: J. J. Smith, p. 437. Ames, p. 184. A herbaceous epiphyte occurring in Sumatra, in the Malay Peninsula, Borneo and west Java where it is common, being found both at high and low elevations. In the Peninsula it is recorded from Penang, the Taiping hills, G. Tahan, the Main chain from the mountains of Telom to G. Mengkuang lebar, on Benom and on the 10000-feet-high hills near Batu Pahat in Johore. It was found at Fraser Hill (8810) carrying its flame-coloured or yellow flowers.

Bulbophyllum montigenum, Ridl. Mat., 1, p. 76: Ames, p. 188. A herbaceous epiphyte of the Peninsula and Borneo: in the Peninsula hitherto recorded only from Benom, and now recorded also from the Main chain at Fraser Hill (8417), where it was obtained carrying its green flowers.

Bulbophyllum pedicellatum, Ridl. in Jour. Linn. Soc. Bot., 31, p. 278. A herbaceous epiphyte, endemic, occurring in Lower Siam at Poongah and at Khasum, and now found on the Main range at Fraser Hill (7891) coming into flower.

Bulbophyllum minutulum, Ridl. n. sp., a small running herbaceous epiphyte, with straw coloured flowers, found at Fraser Hill (7797).

Bulbophyllum nematocaulon, Ridl. n. sp., a small running herbaceous epiphyte with pale green flowers, found at Fraser Hill (8955).

Bulbophyllum sp., apparently a new species, a small running herbaceous epiphyte near *B. linea*, Ridl., but differing in having slightly smaller flowers and narrower leaves (8676).

Bulbophyllum sp. Apparently a new species (1822).

Ceratostylis gracilis, Blume: Ridl. Mat., Mono. 1, p. 109: J. J. Smith, p. 300. A small herbaceous epiphyte found in the Malay Peninsula and in west Java: in the Peninsula it occurs on Kedah peak, on Bukit Seraya which adjoins Bukit Mertajam in Province Wellesley, on the Taiping hills and G. Babu, on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom to G. Angsi; and then down upon the coast in southern Johore. At Fraser Hill it is probably the commonest of all orchids (8449, 8517). The figure in the *Icones Plantarum*, 2098, was drawn from an immature flower, and the spur should be twice as long.

Ceratostylis clathrata, Hook. f.: Ridl., Mat., Mono., 1, p. 111. A small peculiarly tough epiphyte, endemic occurring on the Main range from Ulu Batang Badang to Fraser Hill (7800) and also on Benom.

Calanthe angustifolia, Lindl.: Ridl. Mat., Mono. 1, p. 121: J. J. Smith, p. 205. A terrestrial herb of forests found in Sumatra, the Malay Peninsula and in west Java: found in the Peninsula on Kedah peak, on the Taiping hills, on the Main range from the mountains of Telom to the Semangkok pass and on Benom. At Fraser Hill it occurs sporadic upon the crests of the ridges (8525), and was newly in flower. It was found higher than Fraser Hill towards Pine-tree hill, and in the other direction on G. Ulu Semangkok.

Eria latifolia, J. J. Smith, p. 394: *E. iridifolia*, Hook. f.: Ridl. Mat., Mono. 1, p. 90. A herbaceous epiphyte, in Sumatra, the Malay Peninsula and Java: in the Peninsula found only upon the Main range from G. Bujong Malaka and G. Batu puteh to Fraser Hill (7830), in flower.

Eria major, Ridl. Mat., 1, p. 90: Merrill, p. 172. A herbaceous epiphyte distributed from the Malay Peninsula through Borneo to the Philippines. There are two varieties of it at Fraser Hill one with short leaves (8402) and the other with long leaves (s.n.). The short leaved variety occurs in the Taiping hills. The long-leaved variety occurs there also, and on the Main range from G. Kerbau to the Semangkok pass, and also on Benom. They were obtained in flower, and from Fraser Hill extended towards Pine tree hill.

Eria longifolia, Hook. f.: Ridl. Mat., 1, p. 91. A herbaceous epiphyte, montane, found in Sumatra, in the Taiping hills, on G. Tahan, and on the Main range from the mountains of Telom to the Semangkok pass, and also it is on Benom. It is very common at Fraser Hill (8419), and carried its snow-white flowers.

Eria pilifera, Ridl. Mat., Mono., 1, p. 92. A herbaceous epiphyte, in Sumatra, and in the Peninsula before this known only from the Taiping hills, found on the Main range at Fraser Hill (7871), in flower.

Eria pauciflora, Blume: J. J. Smith, p. 387: *E. monticola*, Hook. f.: Ridl. Mat. Mono., 1, p. 95. A herbaceous epiphyte, distributed in west Java and the Malay Peninsula: occurring on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range from Fraser Hill to Bukit Etam, and on Mt. Ophir; then again on P. Aor off the east coast. At Fraser Hill it is very abundant (8416, 8638) and it was found also on G. Ulu Semangkok (8881) in flower everywhere.

Eria floribunda, Lindl.: Ridl. Mat. Mono., 1, p. 96: J. J. Smith, p. 400: Merrill, p. 170. A herbaceous epiphyte, distributed from Tenasserim to the Malay Peninsula in Sumatra, Borneo and through Java. In the Peninsula it occurs in Lower Siam, and down the west coast to Singapore; then again it is on the mountains e.g. Kedah peak, the Taiping hills, G. Tahan, and the Main range at Fraser Hill (8406) where it attains twice the size of mangrove-swamp examples.

Eria teretifolia, (Griff.: Ridl. Mat. Mono., 1, p. 100: Merrill, p. 174. A herbaceous epiphyte, found in the Malay Peninsula and Borneo: in the Peninsula montane, occurring on Kedah peak, in Penang, on the Taiping hills, on G. Tahan, on the Main range from G. Batu puteh and in the mountains of Telom to G. Tampin, and on Mt. Ophir. At Fraser Hill it is very plentiful (7844, 8595), and was in flower.

Phreatia crassifolia, Ridl. in Jour. F. M. S. Mus., 4, p. 69. A very small epiphyte which is endemic and montane, and has been obtained on the Taiping hills, and on the Main range in the mountains of Telom, and now at Fraser Hill where it was upon a Quercus (7798) in flower.

Spathoglottis plicata, Blume: Ridl., Mat., Mono., 1, p. 117: J. J. Smith, p. 219: Merrill, p. 182. A terrestrial herb, distributed from Sumatra, the Malay Peninsula, Java, Borneo, Celebes, the Moluccas to the Philippines, New Guinea, the Solomon islands and Samoa: in the Peninsula it occurs from Tomoh in Lower Siam down to Singapore at low levels and ascends the mountains somewhat. But Fraser Hill in the valley at 4,000 ft. (7778), the neighbourhood of Fraser Hill at 3,500 ft. towards the Gap, and 3,600 ft. in the upper Tras valley are greater altitudes than others have recorded: however it occurs high in Java. The Fraser Hill plant has the small lip usual in the Peninsula.

Spathoglottis aurea, Lindl.: Ridl., Mat., Mono., 1, p. 118: J. J. Smith, p. 218: Merrill, p. 182. A terrestrial herb, distributed in Sumatra, the Malay Peninsula, Borneo, west and mid Java and the Philippines: in the Peninsula it is montane and occurs on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range

from G. Kerbau, G. Batu Puteh to Bukit Etam, and on Mt. Ophir. At Fraser Hill it was collected on the face of a landslide (7771), which occurrences are apparently the means by which it persists.

Phaius callosus, Lindl.: Ridl. Mat. Mono., 1, p. 119: J. J. Smith, p. 196. A terrestrial herb of forests by water, found in the Malay Peninsula and in west Java: occurring in the Peninsula on the Taiping hills and on the Main range at Fraser Hill (7820), in flower.

Agrostophyllum callosum, Reichb. f.: Ridl. Mat. Mono., 1, p. 108. A herb of rocks or an epiphyte distributed from the central Himalaya through Burma to the Malay Peninsula, montane; occurring in the Peninsula on Kedah peak, and in the Main range from near Fraser Hill to Bukit Etam. Under Fraser Hill it was found in the old mines of the upper Tras valley (7877), in fruit.

Agrostophyllum bicuspidatum, J. J. Sm.: *Podochilus callosa*, Schlechter: Ridl. Mat. Mono., 1, p. 197: J. J. Smith, p. 286: Ames, p. 76. A herbaceous orchid of mossy places, distributed from Tenasserim, in Sumatra, the Malay Peninsula, Java, Borneo and Celebes, in the Peninsula montane in the north, as on Penang hills, on the Taiping hills, on G. Tahan, on the Main range from the mountains of Telom to Bukit Sutu in Negri-Sembilan, and on Mt. Ophir: then at low levels in Johore and Singapore. It was collected near Pine-tree hill (8523) in flower.

Ceratostylis cryptantha, Ridl. Mat. Mono., 1, p. 110. A small epiphyte, endemic, occurring in Penang, on the Taiping hills, and the Main range near the Semangkok pass. The plant collected by us is larger (8511), and constitutes a variety.

Coelogyne carnea, Hook. f.: Ridl. Mat. Mono., 1, p. 134. A herbaceous epiphyte, endemic, occurring in the Taiping hills, on G. Tahan, and on the Main range from G. Kerbau and the mountains of Telom to G. Mengkuang lebar and also on Benom. At Fraser Hill it is abundant (8301, 8626), and up to Pine tree hill (8611), and also upon G. Ulu Semangkok.

Coelogyne speciosa, Lindl.: Ridl. Mat. Mono., 1, p. 132: J. J. Smith, p. 138: Ames, p. 115. An epiphytic herb, distributed from Sumatra to the Malay Peninsula, to Borneo and through Java: in the Peninsula occurring on Western hill, Penang, on the Taiping Hills, on G. Tahan, on the Main range from the mountains of Telom to the Semangkok pass, and then almost at sea-level in the island of Singapore and in southern Johore. It occurs in Java also at low levels, as well as high. It was found at Fraser Hill not uncommonly (8512).

Renanthera matutina, Lindl.: Ridl. Mat. Mono., 1, p. 156: J. J. Smith, p. 587. A tough epiphyte, but able to use stoney ground under the trees, occurring in Sumatra, the Malay Peninsula and in Java: in the Peninsula found on the Main range from the mountains of Telom to the neighbourhood of the Semangkok pass. At Fraser Hill it was found on a vein-quartz ridge (8938) in flower.

Saccolabium bigibbum, Ridl. in Mat., 1, p. 164. but not of Hook. f. A herbaceous epiphyte endemic and montane found on the Taiping hills, on G. Tahan, on the Main range at Fraser Hill (8503) and on Benom. This orchid wants a new name. It was in flower.

Appendicula, apparently a new species, found as a rigidly erect plant of a bronze colour upon the ground in the mined area of the upper Tras valley at about 3600 ft. (8856).

Anoectochilus Reinwardtii, Blume: Ridl. Mat. Mono., 1, p. 312; J. J. Smith, p. 96. A terrestrial herb of the floor of the forest, distributed in Sumatra, the Malay Peninsula, in west Java and Amboyna: in the Peninsula found on Kedah peak, on the Taiping hills, and on the Main range from the mountains of Telom to Fraser Hill (8550, 8621).

Anoectochilus sp. An orchid with the habit of the last, apparently undescribed. It was collected at Fraser Hill (7803) and has been collected by Napier at the Semangkok pass.

Cryptostylis arachnites, Blume: Ridl. Mat. Mono., 1, p. 225; J. J. Smith, p. 59; Ames, p. 139. A terrestrial herb, of wide distribution, in Ceylon, in the hills of Assam and down south in the Malay Peninsula, Borneo, Java and the Philippines: in the Peninsula it occurs on Kedah peak, in Penang, on the Taiping hills, on G. Tahan, and on the Main range from G. Batu puteh to Bukit Etam; then southwards at low levels from Malacca to Singapore. At Fraser Hill it was found towards Pine-tree hill (8506), in fruit.

ZINGIBERACEAE.

Globba aurantiaca, Miq.: Ridl. Mat. Mono., 2, p. 7; Merrill, p. 123. A herb, distributed through the interior of western Malaysia, Sumatra, the Malay Peninsula and Borneo: in the Peninsula it occurs in Penang from 1000 ft. upwards, on the Taiping hills, on the Main range from Fraser Hill to G. Tampin and under it on the west side; then in the south of the Peninsula at low levels to the Straits of Johore. At Fraser Hill it is not uncommon (8429).

Globba cernua, Baker: Ridl. Mat. Mono., 2, p. 8. A herb, endemic and montane, occurring in the south of Lower Siam, on the Taiping hills, on the Main range from the mountains of Telom and G. Kerbau to G. Angsi. It was found in flower between Fraser Hill and Pine-tree hill (8431).

Camptandra ovata, Ridl. Mat. Mono., 2, p. 12. A small herb of the floor of the forest, endemic, and confined to the Main range from G. Kerbau to G. Mengkuang lebar. It is common at Fraser Hill (8639) and its pure white flowers open in the late afternoon, closing again before dawn.

Hedychium malayanum, Ridl. n. sp. A herb, undescribed, which was collected first a couple of years ago by Mrs. Ferguson-Davie at Fraser Hill, and was obtained by us in the upper Tras valley under Fraser Hill (7875) in an area which had been mined.

Amomum ochreum, Ridl. Mat. Mono., 2, p. 32. A herb, endemic, found upon the Main range in the upper Tras valley under Fraser Hill (8862) upon a mune area at 3300 ft. at Ginting Bidai west of Kuala Lumpur, and on Bukit Galing near Kuantan. It was in flower.

Hornstedtia grandis, Ridl. Mat., 2, p. 36. A giant herb, 20 feet high, endemic, occurring in the Taiping hills, and on the Main range from the mountains of Telom to Fraser Hill (8584). There is just so much doubt about this identification as is due to the want of corollas, as the flowers were all over.

Zingiber spectabile, Griff.: Ridl. Mat., 2, p. 26. A herb, found in Sumatra and the Malay Peninsula, occurring in the Peninsula in the lowlands all down the west side from Perlis and Penang to Malacca, and lately found in north-eastern Pahang. It has not been obtained before this as high in the mountains as Fraser Hill (8666). It is used by the Malays locally as a flavouring, calling it Tepus lundok or nodding ginger.

Zingiber gracile, Jack: Ridl. Mat. Mono., 2, p. 29. A herb, more or less montane in the north of the Peninsula, where it occurs in Penang, on the Taiping hills, on G. Tahan, and on the Main range from Fraser Hill to G. Tampin and on Mt. Ophir: it occurs down to the foot of the hills, and southwards on G. Pulau and in Singapore island. It is not uncommon about Fraser Hill, with yellow bracts when in flower (8806) and these redden in fruit-ripening (8633).

Zingiber Griffithii, Baker: Ridl. Mat. Mono., 2, p. 29. A herb, endemic, occurring in the low country from Penang to Singapore, and on the lower slopes of the hills. Its occurrence at Fraser Hill (8808) adds greatly to its recorded spread upwards. It was found in fruit, with reddish magenta bracts.

Alpinia Murdochii, Ridl. Mat. Mono., 2, p. 50. A herb, endemic, occurring on G. Tahan, and on the Main range in the neighbourhood of the Semangkok pass. At Fraser Hill it was found in flower (8671), and between the Gap and G. Ulu Semangkok it was found in fruit (8868).

Alpinia petiolata, Baker; Ridl. Mat. Mono., 2, p. 53. A herb, endemic, distributed in the Peninsula in the Taiping hills, on G. Tahan, and on the Main range from G. Horan and Fraser Hill to G. Tampin. At Fraser Hill it is very common, but was only rarely in flower or in fruit (8434, 8596).

Geostachys secunda, Ridl. Mat. Mono., 2, p. 44. A herb, endemic, found on the Main range from G. Bujong Malaka to the Semangkok pass; very common at Fraser Hill (8636) and in flower. This species is replaced by very closely allied species upon other ranges on the Peninsula.

MUSACEAE.

Musa violascens, Ridl. Mat. Mono., 2, p. 64: Merrill, 120. A giant herb, distributed in Sumatra, the Malay Peninsula and in Borneo: in the Peninsula common at low elevations down both

sides and ascending the mountains to about 4000 ft. At Fraser Hill it is very common (8598). It is called Pisang toh.

Musa malaccensis, Ridl. Mat. Mono., 2, p. 63: A giant herb, endemic, and rather larger than the last, also a little more of a woodland plant, endemic, occurring in the Peninsula commonly in hill lands down both sides from Pulau Adang, Kedah and Kuantan southwards. It is very common at Fraser Hill and carries flowers and fruit (8858). It is called Pisang jahit or thread plantain.

AMARYLLIDACEAE.

Curculigo latifolia, Dryand.: Ridl. Mat. Mono., 2, p. 66. Merrill, p. 117. A herb found in Burma, the Andamans, the Malay Peninsula and Borneo: in the Peninsula it occurs all down both sides to Singapore: it occurs also on G. Kerbau and in the mountains of Telom and southwards along the Main range to G. Angsi. It is not uncommon at Fraser Hill (s.n.).

TACCACEAE.

Tacca cristata, Jack: Ridl. Mat. Mono., 2, p. 77. A herb distributed from Tenasserim to Sumatra and the Malay Peninsula, in the Peninsula occurring in the low country down to Singapore, but it has not been collected from the low country on the east side: it occurs in the mountains of Telom and doubtless in the mountains elsewhere. Under Fraser Hill it was found towards the Gap at 3500 ft. in flower (7765). The hill plants are larger than the plains plants.

DIOSCOREACEAE.

Dioscorea laurifolia, Wall.: Ridl. in Mat. Mono., 2, p. 83. A herbaceous climber, endemic occurring in the Peninsula from Penang to Singapore, preferring the tops of hills, but also descending to sea-level in well-drained places. At Fraser Hill it is very common following clearing, and not rare in the undisturbed forest; its pleasantly scented flower-spikes were to be seen in great abundance (8401, 8433).

Dioscorea sp. with the appearance of *D. pyriformis*, Kunth, but with large tubers that carry a brown tanning or tinctorial substance and called therefore Gadong Sanak by the Malays who make some use of them. This *Dioscorea* reaches 4000 ft. at Fraser Hill but is somewhat more easily found in hollows by water at lower levels both towards the Gap and in the upper Tras valley, where it bore flowers (7860, 7889, 8432, 8945).

LILIACEAE.

Smilax calophylla, Wall.: Ridl. Mat., 2, p. 102. A climber, endemic, a montane species in the north of the Peninsula, occurring on Kedah peak, on the Taiping hills, from 1000 to 1500 ft., on G. Tahan, on the Main range about the Semangkok pass, and to G. Mengkuang lebar, on Benom and on Mt. Ophir, then in the lowlands of Johore and Singapore. It was observed to be not uncommon on G. Ulu Semangkok, and down to the Gap (8867).

Smilax laevis, Wall.: Ridl. Mat. Mono., 2, p. 103: Merrill, p. 116. A climber occurring in China and down to the Malay Peninsula, and Borneo: in the Peninsula montane occurring on Kedah peak, in Penang, on the Taiping hills, on G. Keledang near Ipoh, on the Main range from the mountains of Telom to G. Mengkuang lebar, and on Mt. Ophir. At Fraser Hill it was in fruit (8578).

COMMELINACEAE.

Commelina nudiflora, Linn.: Ridl. Mat. Mono., 2, p. 115: Koorders, 1, p. 277: Merrill p. 112. A pantropic herb, which grows freely at the Gap but appears not to have ascended yet further in the direction of Fraser Hill (s.n.).

Forrestia gracilis, Ridl. Mat. Mono., 2, p. 123. A herb, endemic, a lowland plant occurring from Kedah and Pahang to Singapore. It is not uncommon at Fraser Hill up to 4200 ft. (8869) and in fruit.

PALMAE.

Nenga macrocarpa, Scortechini: Ridl. Mat., 2, p. 145. A palm of moderate size, endemic and in the north of the Peninsula montane occurring on Koh Gah in Lower Siam, on Kedah peak, in Penang upon the very tops of the hills, on the Taiping hills, on G. Tahan and under it, on the Main range from G. Bujong Malaka to G. Tampin, on G. Keledang over Ipoh, on G. Pantai and also in Johore down to sea level. At Fraser Hill by no means uncommon (8609).

Pinanga Scortechinii, Becc.: Ridl. Mat. Mono., 2, p. 138. A palm of about 10 ft. in height, endemic and montane: it occurs in Penang, on the Taiping hills, on Bukit Kapavang near Sungei Siput, on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom to Negri Sembilan; then down at the coast in southern Johore. It occurs freely at Fraser Hill and carried its cherry-red fruits (7885).

Pinanga polymorpha, Becc.: Ridl. Mat. Mono., 2, p. 138. A rather small palm, endemic, and montane, occurring on the Taiping hills, and on the Main range from the mountains of Telom to Bukit Etam. It is plentiful at Fraser Hill (8592, 8617); and with fruit ripening the peduncle becomes a brilliant scarlet.

Pinanga paradoxa, Scheff.: Ridl. Mat. Mono., 2, p. 141. An endemic palm, montane and submontane, occurring on Kedah peak, on the Taiping hills, on the Main range from G. Batu puteh to G. Anosi, on Mt. Ophir and on G. Pantai. It is common at Fraser Hill and the peduncle, which goes a brilliant red as the fruit ripens, makes it conspicuous (8618).

Caryota obtusa, Griff. Ridl. Mat. Mono., 2, p. 157. A beautiful tall palm, endemic in the Peninsula on the Taiping hills, the Main range from G. Batu puteh to the neighbourhood of Kuala Lumpur, and on G. Pantai in Johore. At Fraser Hill it occurs in hollows certainly up to 4200 ft.; and about 3300 ft. some very fine examples were seen.

Licuala pusilla, Becc.: Ridl. Mat. Mono., 2, p. 164. A small palm, endemic, occurring on the Taiping hills, on G. Tahan and on the Main range about Ulu Bubong and the Semangkok pass. At Fraser Hill it is very common (7842, 8426) it was in flower and in fruit, and produced stems attaining 2 ft.

Calamus javensis, Blume: Koorders, 1, p. 234: Merrill, p. 75: *C. penicillatus*, Roxb.: Ridl. Mat. Mono., 2, p. 191. A rattan distributed in Sumatra, the Malay Peninsula, Borneo and west and mid Java: in the Peninsula it is montane in the north, on G. Kaya in Lankawi, Penang, the Taiping hills, the Main range from G. Batu puteh and the mountains of Telom to G. Angsi, and southwards both on hills and down to sea level in Singapore island. At Fraser Hill it seems uncommon: it occurs (7814) in the variety *peninsularis*, which is characteristic of the Peninsula.

Calamus luridus, Becc.: Ridl. Mat. Mono., 2, p. 198: Merrill, p. 75. A rattan of about 25 ft. in length occurring in the Malay Peninsula and in Borneo: in the Peninsula it is usually found at low levels from Taiping to Singapore. At Fraser Hill it was collected as no. 8807: but there is just a little doubt in regard to the determination. The Malays with us called it Rotan lilin or wax rattan.

Calamus perakensis, Becc.: Ridl. Mat. Mono., 2, p. 202. A rattan about 20 ft. long, which is endemic, and (including part of *C. lunata*, Ridl. in it) has the following distribution:—Bukit Kapayang near Sungei Siput, and the Main range from the mountains of Telom to Bukit Etam. It was found at Fraser Hill in flower (7757) and in fruit (8421).

Calamus distichus, Ridl. Mat. Mono., 2, p. 206. A rattan of about 15 ft. in length, endemic and local: at Fraser Hill not uncommon, carrying its curiously long (5 ft.) inflorescences (8683 and s.n.).

Calamus brevispadix, Ridl. Mat. Mono., 2, p. 207. A small very spiny rattan only a few feet high, endemic and local. At Fraser Hill it is plentiful and was in flower (8420, 8551).

Daemonorrhops sp. A species of this genus occurs, but has not been determined (7785).

Plectocomia sp. possibly *P. Griffithii*, Becc., is not uncommon about Fraser Hill as it appears to be in the mountains of Telom.

FLAGELLARIACEAE.

Joinvillea borneensis, Becc.: Merrill, p. 109: *J. malayana*, Ridl. Mat. Mono., 3, p. 151. A big grass-like plant 6-8 ft. high occurring in the Malay Peninsula, Borneo and Palawan: in the Peninsula occurring in the Taiping hills, and on the Main range from G. Kerbau and the mountains of Telom to the Semangkok pass. It occurs at Fraser Hill at 4000 ft. (8649).

PANDANACEAE.

Pandanus collinus, Ridl. Mat. Mono., 2, p. 228. A small tree, endemic and montane in the Peninsula, occurring on Kedah

peak, and on the Main range from the mountains of Telom to the Semangkok pass. At Fraser Hill it was not identified; but it was got in fruit on G. Ulu Semangkok (8876).

Freycinetia lucens, Ridl. Mat. Mono., 2, p. 233. A woody climber, endemic, chiefly of the low country along the west side of the Taiping hills and the Main range from Perak to Singapore. now found in flower upon the summit of Pine-tree hill at 4800 ft. (8546), and sterile between that hill and Fraser Hill.

ARACEAE.

Arisaema Scortechinii, Hook. f.: Ridl. Mat. Mono., 3, p. 8. A herb, endemic, montane, occurring in Penang, and on the Main range from G. Bujong Malaka to G. Tampin. At Fraser Hill it is not uncommon (8665), and was newly in flower.

Amorphophallus sp. The leaves of a species of this genus were seen not uncommonly in the forest at Fraser Hill.

Alocasia Beccarii, Engl.: Ridl. Mat. Mono., 3, p. 16: Merrill, p. 104. A herb of deep shade found in Sumatra, the Malay Peninsula and in Borneo: in the Peninsula montane occurring in the Taiping hills, and on the Main chain from the mountains of Telom to Bukit Etam. At Fraser Hill not uncommon and generally in fruit (8125).

Alocasia Lowii, Hook. f.: Ridl., Mat., Mono., 3, p. 18: Merrill, p. 105. A herb, distributed in the Malay Peninsula, Borneo and Java: in the Peninsula in Perlis, and down the Main range from Perak to the south end, and in Malacca; also in P. Tiunan. Below Fraser Hill it occurs at 3300 ft. on the road to the Gap and at 3800 ft. in the upper Tras valley.

Colocasia esculentum, Schott: Merrill, p. 106: *C. antiquorum*, Schott: Ridl., Mat. Mono., 3, p. 16: Koorders, 1, p. 136. A herb, widely cultivated and wild in tropical Asia: run wild in Sumatra, the Peninsula, Borneo and other parts of Malaysia. In the upper Tras valley to about 3800 ft. it is plentiful.

Homalonema humilis, Hook. f.: Ridl. Mat. Mono., 3, p. 25: Merrill, p. 94. A small herb, occurring in the Malay Peninsula and in Borneo: in the Peninsula montane and submontane, in Penang, on the Taiping hills, on the Main range from the mountains of Telom to the neighbourhood of Kuala Lumpur and in the low country under the hills. At the Semangkok pass in the vicinity of the Gap it occurs (7879) in a race which approximates to *H. pumila*, Hook. f.

Schismatoglottis sp. What seems to be an unnamed plant of the Main range and the Taiping hills was obtained (8696).

Anadendrum montanum, Schott.: Ridl. Mat. Mono., 3, p. 36: Koorders, 1, p. 252: Merrill, p. 88. An epiphyte, more or less herbaceous, found in Tenasserim, and Siam, Sumatra, the Malay Peninsula, Borneo, Java, Celebes: in the Peninsula it occurs on G. Rava in Iankawi, on Kedah peak, in Penang, on the Taiping hills, on the hills over Ipoh and Sungei Siput, on the Main range from the mountains of Telom to G. Tampin, and at low levels further south to Singapore. At Fraser Hill it was found in flower.

Raphidophora Korthalsii, Schott: Ridl. Mat. Mono., 3. p. 45: Koorders, 1, p. 255: Merrill, p. 89. An epiphyte of considerable size, distributed chiefly in the interior of western Malaysia i.e. in the Peninsula and in Borneo but reaching west Java in one place: in the Peninsula it occurs in Penang, but has not been collected there in recent years, on the Taiping hills, in the Main range about the Semangkok pass, on P. Tinggi and in Singapore island. It was found between Fraser Hill and the Gap at 3500 ft. in the edge of a gully, in flower (7761).

Raphidophora Wrayii, Hook. f.: Ridl. Mat. Mono., 3. p. 42. An epiphyte of some size, endemic, occurring in Penang, on the Taiping hills, and on the Main range from G. Batu putch and the mountains of Telom to Fraser Hill (7859) where it is not uncommon and was in flower and fruit.

Pothos salicifolia, Ridley sp. nov. with almost linear leaves and dull yellow fruit (7827) at Fraser Hill.

Scindapsus Scortechinii, Hook. f.: Ridl. Mat. Mono., 3, p. 38. A big epiphyte, endemic and montane, occurring in the Bandon province of Siam at 4000 ft., on Kedah peak, in the Taiping hills, and on the Main range from G. Bujong Malaka and the mountains of Telom to Bukit Etam. At Fraser Hill it was in flower and fruit (8659, 8934) and extended to the summit of Pine-tree hill (8547).

CYPERACEAE.

Cyperus rotundus, Linn.: Ridl. Mat. Mono., 3. p. 68: Merrill, p. 56: (*C. rotundatus*, Linn.: Koorders, 1, p. 190. A herb, pantropic, in the Peninsula occurring here and there. At Fraser Hill not common (7893).

Kyllingia brevifolia, Roth.: Ridl. Mat. Mono., 3. p. 58: Merrill, p. 58: *Cyperus brevifolius*, Suringar: Koorders, 1, p. 185. A small herb, pantropic and into warm regions generally except south Europe: in the Peninsula general in the low country, but except that it has been collected before on the top of the hills in Penang and at 4000 ft. on G. Kerbau with no montane records, but to be expected at all elevation as the result of the invasion of man. At Fraser Hill it is found about the mined area (7853).

Fimbristylis annua, R. and S.: Merrill, p. 60: *F. diphylla*, Vahl: Ridl. Mat. Mono., 3, p. 91: Koorders, 1, p. 199. A herb, pantropic, very common through the Peninsula and reaching Fraser Hill (8953) as a new intruder, being found chiefly upon bullock-droppings.

Hypolytrum latifolium, L. C. Rich.: Ridl. Mat. Mono., 3, p. 100: Koorders, 1, p. 184: Merrill, p. 54. A herb, distributed in southern India and Ceylon, in north eastern India and China and southwards to the Malay Peninsula, Borneo, west Java and to Australia and parts of Polynesia: in the Peninsula it is common through the low country and has been collected at 2000 and 3500 ft. on G. Kerbau, on Hermitage hill and on the Penang hills. It was not found at Fraser Hill but at 3000 ft. near the Gap (8885) in young fruit.

Gahnia javanica, Moritzi: Ridl. Mat. Mono., 3, p. 99: Koorders, 1, p. 202: Merrill, p. 63. A herb, distributed from Sumatra through the Peninsula, Borneo, west and mid Java to New Caledonia and Fiji: in the Peninsula montane found on Kedah peak, in Penang at 2500 ft., on the Taiping hills, on G. Tahan, on the Main range from G. Kerbau and G. Batu patch to Bukit Etam, on Mt. Ophir, and in Johore upon quite low hills, even on Bukit Panggerang at the extreme south. At Fraser Hill it is exceedingly common in cleared places (7768), but very rarely in flower.

GRAMINEAE.

Paspalum conjugatum, Berg. Ridl. Mat. Mono., 3, p. 124: Koorders, 1, p. 121. A herb, pantropic, in the Peninsula very common at low elevations; but of its occurrence in the hills there seems to be but two records which are both Mr. Ridley's, one of his finding it at Padang Batu on Mt. Ophir and the second of finding it on Sakai clearings in the mountains of Telom. At Fraser Hill it is the commonest of all grasses about the houses (s.n.).

Paspalum sanguinale, Lam.: Ridl. Mat. Mono., 3, p. 125: Koorders, 1, p. 127. A pantropic herb, in the Peninsula common at low elevations, but scarcely recorded as in the hills. At Fraser Hill it is rare at present, and the place in which it is found is bullock-droppings upon the roads (8952).

Paspalum longiflorum, Rotz. Ridl. Mat. Mono., 3, p. 126: Koorders, 1, p. 121: Merrill, p. 13. A herbaceous weed of wide distribution through the warm parts of the Old World: in the Peninsula said to be common. At Fraser Hill a weed in the vegetable garden (7849).

Panicum indicum, Linn.: Ridl. Mat. Mono., 3, p. 134: Koorders, 1, p. 132. A herb distributed from India in general to the Pacific: in the Peninsula a common weed, which has been recorded as reaching 3000 ft. on G. Kerbau. At Fraser Hill it is abundant on cleared ground (7845).

Panicum plicatum, Lam.: Ridl. Mat. Mono., 3, p. 136: *P. palmifolium*, Koen.: Koorders, 1, p. 135. A herb, in Ceylon, in the moister Himalaya, China and southward to the Malay Peninsula, Java: in the Peninsula it occurs not uncommonly at low levels. Under Fraser Hill it was found at 3500 ft. in the mined area of the upper Tras valley.

Isachne albens, Trin. The second in abundance of the intruding grasses of Fraser Hill. It occurs on G. Tahan and on G. Hijau, in the Taiping hills, and has probably reached Fraser Hill in vegetable seeds from the Taiping hill-garden. It is now common on roadsides at Fraser Hill (7767).

Imperata cylindrica, Bauh: Merrill, p. 38: *I. arundinacea*, Cyrillo: Ridl. Mat. Mono., 3, p. 152: Koorders, 1, p. 102. A pantropic grass, everywhere in the Peninsula. This—the tall lallang

grass probably reached the neighbourhood of Fraser's bungalow many years ago; but it does not thrive to the exclusion of everything else there, and though common in that part of Fraser Hill is not general: it is more plentiful in the upper Tras valley.

Pogonatherum paniceum, Hack.: Merrill, p. 40: *P. saccharoidium*, Brauv., Ridl. Mat. Mono., 3, p. 154: Koorders, p. 107. A small grass widely distributed from India to Japan and southwards to Malaysia, where it is wide spread. Under Fraser Hill in the mined lands of the upper Tras valley it is plentiful.

Sporobolus indicus, R. Br.: Ridl. Mat. Mono., 3, p. 171: Koorders, 1, p. 146. A pantropic herb; in the Peninsula sporadic through the lowlands. At Fraser Hill it is not uncommon about clearings (s.n.).

Eleusine indica, Gaertn.: Ridl. Mat. Mono., 3, p. 174: Koorders, 1, p. 153: Merrill, p. 50. A pantropic weed, common in the lower country of the Malay Peninsula. At Fraser Hill invading the roads from the droppings of bullocks.

Phragmites Karka, Trin.: Ridl. Mat. Mono., 3, p. 175: Koorders, 1, p. 156: Merrill, p. 50. A large grass widely distributed through the tropics of the Old World. In the upper Tras valley over mined lands at 3300-3800 ft.

Lophatherum gracile, Brongn.: Ridl. Mat. Mono., 3, p. 181: Koorders, 1, p. 160: Merrill, p. 52. A grass distributed in southern India and Ceylon, in the eastern Himalaya and to Japan, southwards through Burma to the Malay Peninsula, Borneo, the Philippines and New Guinea: in the Peninsula found widely in the South; but in the north montane, being on Chong in west Siam at 2500 ft., on Kedah peak and on the Taiping hills. At Fraser Hill it is not uncommon.

Dendrocalamus pendulus, Ridl. Mat. Mono., 3, p. 192. A graceful bamboo, half sprawling occurring in the Main range from the mountains of Telom to the neighbourhood of Kuala Lumpur. At Fraser Hill it reaches 4100 ft. (7892), but as it was not in flower doubt attaches to the identification.

Schizostachyum latifolium, Gamble: Ridl. Mat. Mono., 3, p. 190: Koorders, 1, p. 179. A rather short bamboo distributed in the Peninsula and thought that it may be possibly in Java: in the Peninsula it occurs on G. Tahan, and on the Main range from G. Kerbau to the Semangkok pass and at low level in Malacca. Under Fraser Hill it ascends to 3500 ft. on the Selangor side of the range (7774).

CRYPTOGAMS.

The nomenclature of the ferns is that adopted by van Alderwerelt. Distributions of mosses are taken from Brotherus' monograph on the Bryales in Engler's *Pflanzenfamilien* (I, 3). The works quoted under each species are:—

Van Alderwerelt van Rosenburgh, C. R. W. K., *Handbook to the ferns of the Malay Islands*, Batavia 1908; *Supplement*, 1917; quoted as van Alderwerelt.

Ridley, H. N., A list of the ferns of the Malay Peninsula, *Jour. Straits Branch, R. Asiatic Society* No. 50, 1908; quoted as Ridley.

Ridley, H. N., The Fern-Allies and Characcae of the Malay Peninsula, *Jour. Straits Branch, R. Asiatic Society* No. 80, 1919; quoted as Ridley Fern-Allies.

Beddome, R. H., *Handbook to the ferns of British India*. Calcutta, 1883, with Supplement; quoted as Beddome.

FERNS.

Gleichenia glauca Hk.; van Alderwerelt p. 58, Ridley p. 6, Beddome p. 2. On the Himalayas at 4000-7000 feet, in southern China and Japan, extending through Malaysia to the Philippines, Polynesia and Australia, and in Central America. In Java and in the Peninsula it is a montane species, abundant on the hills from about 1000 feet upwards. Common at Fraser Hill, in the open and in moderate shade (8778).

Gleichenia linearis Clarke; van Alderwerelt p. 59; Ridley p. 7; Beddome p. 4.

Tropical and subtropical, throughout the world. Very common everywhere in the Peninsula. At Fraser Hill quite as abundant as at lower altitudes. A very large form was found by the valley path (8777).

Cyathea moluccana R. Br.; van Alderwerelt p. 15; *C. brunonis* Wall. Ridley p. 7.

Confined to the Malaysian region and the Philippines. In the Peninsula it is common in forests at low altitudes, the highest record being 3300 feet on G. Tahan. It does not occur at Fraser Hill, but is common by roadsides at the Gap (8826).

Alsophila dubia Beddome Suppl. p. 4, van Alderwerelt p. 31, Ridley p. 9.

This species is recorded from Java, Sumatra and Borneo; in the Peninsula it has been collected on the Taiping Hills and on G. Bubu, on G. Tahan, and on the main range from G. Kerbau to Fraser Hill, where it is fairly common in more open places in the jungle (8797, 8813).

Alsophila obscura Scort.; van Alderwerelt p. 34; Ridley p. 9.

Probably endemic. This species was originally found by Scortechini on the Taiping Hills; specimens collected subsequently at other localities appear to be identical with it, but have been referred to *A. comosa* Hk. They are, however, quite distinct from specimens of the latter species from Perak, named at Calcutta, which also agree with Hooker's description and figure (Spec. Fil. Vol. I, p. 53, Pl. 20). Including these specimens which appear

erroneously to have been referred to Hooker's species, *A. obscura* occurs in Penang, on the Taiping Hills, on the main range from Telom to G. Angsi, on Mt. Austin in Johore and on Singapore Island. Some of the fronds from Singapore differ more or less from the typical form of the species, being paler and less coriaceous. At Fraser Hill, it is one of the smaller tree ferns, fairly abundant. (8779, 8796).

Alsophila commutata Mett.; van Alderwerelt p. 34; Ridley p. 8; Beddome p. 14.

Known only from Batjan and Borneo (van Alderwerelt, Supplement p. 59) outside the Peninsula. A montane species, occurring on Kedah peak, Taiping Hills, on the main range from Bujong Malacca to Bukit Kutu, and on Mt. Ophir. A small tree fern, growing on Fraser Hill in partly cleared forest (8793), and in low forest on G. Ulu Semangkok (8912), where it was not found fertile. A curious feature, not mentioned by the authors quoted, but shewn also by Ridley's specimens from Bujong Malacca and Bukit Hitam, is the presence of several much reduced pinnae at the bases of the stipes (cf. a similar feature in *Cyathea Beyrichiana*, figured in Christ, *Geographie der Farnae*, Jena 1910, p. 45).

Alsophila Kingii Clarke; van Alderwerelt p. 36; Ridley p. 9; Beddome p. 475.

Endemic. Originally collected on G. Bubu at 5000 feet, and since found on G. Tahan, and on G. Pantai in Johore, (Ridley), but we have no specimen from the last-named locality. Found in a rather open situation on the quartz slope below Reservoir Crest, and not noticed elsewhere (8492). The fertile pinnules are very much reduced.

Alsophila latebrosa Wall.; van Alderwerelt p. 38, Suppl. p. 51; Ridley p. 8; Beddome p. 11.

Occurs on the mountains of southern India from 3000 to 7000 feet, and in northern India from 3500 to 5000 feet, throughout Malaysia to the Philippines and in southern China. On the Peninsula "the commonest tree fern in the low country" (Ridley). It has been found up to 5000 feet on the Taiping Hills, on Penang Island, and at numerous localities in Selangor, Malacca, Negri Sembilan, Johore and Singapore Island. In Java very common up to the middle mountain zone. At Fraser Hill, probably the commonest of the smaller tree ferns (8825, 8794).

Alsophila glauca, J. Sm.; van Alderwerelt p. 41; Ridley p. 8; Beddome p. 12.

Distributed from the hills of northern India and Burma throughout the Malaysian region to the Philippines. In the Peninsula it is a montane species, occurring on G. Raya, Lankawi, the Taiping Hills, on the top of Penang hill, on the main range south to G. Angsi, and on Bukit Soga in Johore. It has also been collected on Pulau Tioman. The largest tree fern in the

Fraser Hill area, frequent in open places in the jungle and especially abundant in the valley which had been formerly cleared for tin mining (8812).

Cibotium barometz J. Sm.; van Alderwerelt p. 48; Ridley p. 10; Beddome p. 24.

Distributed probably throughout Malaysia, in the Philippines, Assam and southern China. In the Peninsula "in woods at no elevation, not rare" (Ridley). It has been collected on Kedah peak at 1100 feet, on the Taiping Hills, at various points on the main range from G. Kerbau to Bukit Kutu, at Klang Gates and on Penang Island. Abundant in cleared places and also in moderate shade, the fronds sometimes as much as 15 feet in length, including the stipe.

Hymenophyllum australe Willd.; van Alderwerelt p. 69 and 79†; *H. javanicum* Spr., Ridley p. 11, Beddome p. 32.

Extends from the Himalayas through Malaysia to Australia and New Zealand. In the Peninsula it has been collected on the Taiping Hills, on the main range at Telom and Ginting Sempah, on Mt. Ophir and on G. Pulai in Johore. It was found at Fraser Hill by Mrs. Smith.

Hymenophyllum Blumeinum Spr.; van Alderwerelt p. 71; *H. polyanthos* Sw., Ridley p. 10, Beddome p. 30.

Generally distributed through the rain forest regions of tropical Asia. In the Peninsula found at many localities, on the hills in the north and at lower altitudes in Johore and Singapore. At Fraser Hill this species was collected by Mrs. Smith; the fronds are broad, and do not correspond to Beddome's *H. polyanthos* v. *Blumeinum*.

Hymenophyllum formosum Brack.; van Alderwerelt p. 72; *H. dilatatum* Sw., Ridley p. 11, Beddome Suppl. p. 7.

Extends from Malaysia into the Pacific, to Australia and New Zealand. In the Peninsula it has previously been collected on the Taiping Hills only. It is represented in Mrs. Smith's collection.

Hymenophyllum serrulatum C. Chr.; van Alderwerelt p. 79; *H. Smithii* Hk., Ridley p. 11, Beddome p. 34.

A Malaysian species, extending to New Guinea. In the Peninsula it has been found on the Taiping Hills, on the main range from Bujong Malacca to Bukit Hitam in Selangor, on Penang Hill, G. Benom, and in Johore and Singapore. At Fraser Hill, it is very abundant on trees in the jungle (8451).

Hymenophyllum Neesii Hk.; van Alderwerelt p. 81, Ridley p. 11, Beddome p. 35.

Occurs in Ceylon and Malaysia. In the Peninsula "common on trees, low country up to 4000 feet" (Ridley); it has been collected from numerous localities, including Singapore. At Fraser Hill it is very abundant (8413, 8415).

Trichomanes sublimatum K. Müll.; van Alderwerelt p. 86;
T. muscoides Sw. var. *sublimatum*. Ridley p. 12.

On the Khasya Hills and through Malaysia to New Guinea. In the Peninsula it is probably widely distributed, and has been found on Bukit Malacca, Mt. Ophir, in the Telok Reserve near Klang, and in Singapore Island. At Fraser Hill it was seen twice, on deeply shaded wet rocks by small streams (9180).

Trichomanes digitatum Sw., van Alderwerelt p. 89, Ridley p. 12; Beddome p. 39.

Found in the Mascarenes, Ceylon, and through Malaysia to Polynesia and Australia. In the north of Peninsula it is only recorded from the hills (Taiping Hills, main range from G. Kerbau to Bukit Kutu, G. Tahan at 4000-5000 feet) but it is found on Singapore Island. At Fraser Hill it is common on tree trunks near the ground, in the forest (8770).

Trichomanes proliferum Bl.; van Alderwerelt p. 90, Ridley p. 13; Beddome p. 39.

On the hills of Ceylon and southern India, in Malaysia and the Philippines. In the Peninsula it has only been recorded from the Taiping Hills, up to 4000 feet. At Fraser Hill found on tree trunks in the forest (8836).

Trichomanes bipunctatum Poir.; van Alderwerelt p. 95, Ridley p. 13, Beddome p. 41.

Occurs in tropical Africa, tropical Asia, Polynesia and Australia. It has been collected in both low and high country, certainly up to 4000 feet, in various parts of the Peninsula, and in Singapore Island. At Fraser Hill it is one of the less abundant species. It is possible that the specimen should be referred to *T. bilabiatum*, an allied species with a more restricted distribution (8833).

Trichomanes maximum Bl.; van Alderwerelt p. 99, Ridley p. 14; Beddome Suppl. p. 10.

A species common to Malaysia, Polynesia and northern Australia. It has been collected on the hills in the Peninsula from G. Kerbau to Johore, but not in the low country. At Fraser Hill collected once only, on shaded rocks above the stream in the valley (8903).

Trichomanes rigidum Sw.; van Alderwerelt p. 102, Ridley p. 13; Beddome p. 44.

A pantropical species, in the Peninsula collected especially from the hill forests, but also found in Singapore Island. At Fraser Hill it is one of the few species which are found in full shade on the ground in the forest, and is abundant (8465).

Trichomanes pluma Hk.; van Alderwerelt p. 106, Ridley p. 14; Beddome Suppl. p. 11.

In Malaysia and Polynesia, extending to New Caledonia. Found in hill forests in the Peninsula on the Taiping Hills, on the main range from G. Berumban to Ginting Bidai, on G. Tahan

and Mt. Ophir, the highest record being 6000 feet on G. Kerbau. At Fraser Hill it is a fairly common species of the forest floor, occasionally found on the bases of tree trunks (8734).

Oleandra neriiformis Cav.; van Alderwerelt p. 152. Ridley p. 40; Beddome p. 285.

This species is found in tropical Africa and America, on the eastern Himalayas at 2000-5000 feet, through Malaysia to New Guinea and Polynesia. In the Peninsula it is montane, and has been found at nearly all localities where collections have been made. It has a decidedly xerophytic habit and at Fraser Hill was sometimes found in the fern thickets in open places, though usually growing in the jungle, climbing some distance up the tree (8497). The form collected differs somewhat from typical *O. neriiformis*, in that the stipes, which are always very short, are jointed at the base of the lamina. In other respects it agrees with *O. neriiformis* rather than with *O. colubrina*.

Nephrolepis acuminata, Kuhn.; van Alderwerelt, p. 159; *N. davallioides* Kze., Ridley p. 39, Beddome Suppl. p. 81.

Confined to Malaysia and New Guinea. In Java it is a common epiphyte, from the low country to the middle forest zone of the mountains. In the Peninsula it has been collected on the Taiping Hills at 3600-4000 feet, at Telom, and on Bukit Hitam at 4000 feet. At Fraser Hill it is a common epiphyte, growing luxuriantly on the trunks of trees in the jungle, the fronds up to 2 m. in length. It occurs also on the rocks in the open mining valley (8848, 8494).

Nephrolepis cordifolia, Pr.; van Alderwerelt, p. 160, Beddome p. 282.

A pantropical species, occurring throughout the Indian region up to 5000 feet elevation, and in Java a common ground fern in not too deeply shaded or quite open places up to 8000 feet. There are no specimens from the Peninsula in the Singapore herbarium and Ridley does not record it. At Fraser Hill it was found on bare ground, quite in the open (8495).

Nephrolepis exaltata, Schott.; van Alderwerelt, p. 161, Ridley p. 39, Beddome p. 282.

A pantropical species. Abundant at low altitudes at least in the south of the Peninsula, but little collected in the north, except at Penang. It often grows on trees and rocks, with long pendulous fronds. The present writer cannot certainly say what is its frequency and habit at Fraser Hill, but it is probably abundant. Mrs. Smith's specimen is labelled "open space, jungle."

Nephrolepis biserrata, Schott.; van Alderwerelt, p. 162; *N. acuta*, Pr., Ridley p. 39, Beddome p. 284.

A pantropical species. It is very abundant in the south of the Peninsula where secondary growth is beginning to replace cleared jungle; it has hardly been collected in the north except on Penang Island. At Fraser Hill comparatively small plants were noted on cleared ground.

Dryopteris crassifolia, O. Kze.; van Alderwerelt, p. 182;
Lastraea crassifolia, Ridley p. 35, Beddome p. 238.

Burmah and Malaysia, extending to the Philippines. In the Peninsula it is probably general in the forests of the low country and on the hills to at least 4000 feet. It has been collected on Singapore Island and in the lowland forests of Johore and Malacca, and also on Mt. Ophir and the Taiping Hills. A ground fern of the jungle, noticed only on South Ridge (8765).

Dryopteris calcarata, O. Kze.; van Alderwerelt, p. 185;
Lastraea calcarata, Beddome p. 235, Ridley p. 35.

General throughout southern tropical Asia, Malaysia and the Philippine, extending into Polynesia. In the Peninsula the typical form of the species has only been collected on the Taiping Hills, on G. Kerbau and Ulu Semangkok. At Fraser Hill it is a common ground fern of the jungle, the stem sometimes projecting nearly a foot above the surface of the ground (8736, 8790).

Dryopteris singalanensis, C. Chr.; van Alderwerelt, p. 192;
Lastraea singalanensis Beddome Suppl. p. 54, Ridley p. 35.

Previously known from the Taiping Hills at 3500-4000 feet, and from Mt. Singalan in Sumatra. At Fraser Hill collected once only, on the open valley-side (8811).

Dryopteris ferox, O. Kze.; van Alderwerelt, p. 221; *Nephrodium ferox* Moore, Beddome p. 279, Ridley p. 38.

In northern India, Malaysia and the Philippines. In the Peninsula it has been collected only on the Taiping Hills at 2000 feet, at Fraser Hill and on Penang Hill. Only one mature specimen was seen (8795), in partially cleared jungle on the valley side, but young plants, probably of this species, were abundant near by.

Dryopteris parasitica, O. Kze.; van Alderwerelt, p. 224;
Nephrodium molle R. Br., Ridley p. 37, Beddome p. 277.

Pantropical. Common throughout the Peninsula, in the low country and on the hills (8901).

Dryopteris truncata, O. Kze.; van Alderwerelt, p. 227;
Nephrodium truncatum Pr., Ridley p. 38, Beddome p. 280.

Extends to Madagascar and to Polynesia and Australia. In the Peninsula it has been collected in low country in Perak, and also on the Taiping Hills and on G. Kerbau at 5000 feet, and at low altitudes in Selangor, Johore and Singapore. It was found by Mrs. Smith at Fraser Hill.

Dryopteris heterocarpa, O. Kze.; van Alderwerelt, p. 228;
Nephrodium heterocarpum Moore, Ridley p. 38, Beddome Suppl. p. 78.

A western Malaysian species, collected in the Peninsula on the Taiping Hills at 2500-3000 feet, at Telom in Pahang, in Negri Sembilan and on the Islands of Penang and Singapore. At Fraser Hill it was only found below 4000 feet, abundantly by the forest path down to the Gap and in the mining valley (8814, 8763).

Mesochlaena larutensis, (Bedd.) van Alderwerelt, p. 232; *Nephrodium larulense* Beddome, Suppl. p. 73, Ridley p. 38.

Reported only from Borneo (Copeland) outside the Peninsula. The species was originally collected on the Taiping Hills, and has since been found at Telom and Ginting Sempah on the main range. It was not noticed at Fraser Hill, but was found once only in the forest at the foot of G. Ulu Semangkok, just above the Gap (8913).

Aspidium pachyphyllum, Kze.; van Alderwerelt, p. 252, Ridley p. 33, Beddome Suppl. p. 46.

A Malaysian and Polynesian species, previously collected in Perak at altitudes from 100 to 1500 feet. At Fraser Hill it was only found by the present writers by the valley path in the edge of the jungle (just below 4000 feet) and always sterile. Mrs. Smith, however, sent a fertile frond, collected at about 4000 feet.

Odontosoria chinensis, J. Sm.; van Alderwerelt, p. 259; *Stenoloma chinensis* Bedd., Ridley p. 19, Beddome p. 70.

In Madagascar, Ceylon and southern India on the mountains, northern India to southern China and Japan, and through Malaysia to the Philippines and Polynesia. In the Peninsula "on banks at considerable altitudes, this plant seems to prefer stiff yellow clays" (Ridley). It has been collected at Jor in Perak, on the main range at the Semangkok pass and Ginting Bidai, by the Tahan river and on Penang Hill. At Fraser Hill abundant in open places on the clay, not usually among the first plants on bare ground (8496).

Lindsaya pectinata, Bl.; van Alderwerelt, p. 269.

Distributed from Assam through Malaysia to the Philippines. This species is hardly distinguishable from *L. scandens* on the one hand and from *L. repens* (with which it is included by Beddome) on the other; the present specimen has exactly the form and habit of *L. scandens* except for a slight lobing of the edge of the leaflets, and consequent interruption of the sori, while specimens from elsewhere with less decurved lower margins of the leaflets grade into *L. repens*. All are creeping or climbing ferns of the jungle and are widely distributed in the Peninsula. *L. pectinata* is common at Fraser Hill (8152); *L. scandens* proper was not noticed.

Lindsaya orbiculata, Mett.; van Alderwerelt, p. 270, Ridley, p. 20, Beddome p. 75.

In Ceylon and southern India, northern India to southern China, and through Malaysia to Australia. In the Peninsula it is a ground fern of the forest, chiefly montane. It has been collected on Kedah Peak at 1000 feet, on the Taiping Hills, on the main range from Bujong Malacca to G. Angsi, on G. Tahan, and on Penang Island. At Fraser Hill it is one of the most constant ground ferns, occurring in quite deep shade (8400).

L. orbiculata var. **polymorpha**, Hk.

No. 8762. This form is equally abundant with the typical form of the species, and in some cases shows transitions to the

latter. The only other specimens of this variety in the Singapore herbarium are from Penang.

Lindsaya decomposita, Willd.; van Alderwerelt, p. 271; *Schizoloma lobata* Beddome, p. 77, Ridley p. 21.

In Ceylon and southern India, through Malaysia to Polynesia and Australia. In the Peninsula not confined to the mountains, at least in the south, being found at low altitudes in Johore and Negri Sembilan. It is difficult to separate this species from *L. davallioides*. At Fraser Hill it occurs along with *L. orbiculata* (8707, 8474). Some specimens show little or no anastomosis of veins.

Humata repens, Diels; van Alderwerelt, p. 288; *H. pedata*, J. Sm., Ridley p. 16, Beddome p. 48.

In the Mascarenes, Ceylon and southern India at 3000-4000 feet, the eastern Himalayas and southern China, and through Malaysia to Australia. In the Peninsula it is not confined to the mountains and has been collected at numerous localities. At Fraser Hill it is a common epiphyte, the fronds frequently rather small (8463).

Davallia bullata, Wall.; van Alderwerelt, p. 303, Ridley, p. 17, Beddome p. 61.

Found on the mountains of southern India, on the eastern Himalayas to 6000 feet, in Burmah, southern China and Japan, Malaysia and the Philippines. In the Peninsula it is montane, occurring on Kedah Peak at 3000-4000 feet, on the Taiping Hills, and on the main range from G. Berumban to Ginting Bidai. At Fraser Hill, a fairly common epiphyte (8706).

Davallia divaricata, Bl.; van Alderwerelt, p. 305, Ridley, p. 17, Beddome p. 60.

Found on the eastern Himalayas and in southern China, Malaysia and the Philippines. In Java it is a common epiphyte, from sea level to the lower forest zone; in the Peninsula it has previously been collected only on the Taiping Hills at 3000 feet. At Fraser Hill, found only at about 3500 feet, in the old mining valley, on granite boulders near the stream (8846).

Tapeinidium pinnatum, C. Chr.; van Alderwerelt, p. 314; *Microlepia pinnata* J. Sm., Ridley p. 18, Beddome p. 64.

In southern India and spread through Malaysia to Polynesia. In the Peninsula it has been found on the Taiping Hills at 2000-3000 feet, on the main range from Telom to G. Tampin, on G. Tahan at 3000 feet, on Penang Hill, Mt. Ophir and G. Pulai, and in Singapore Island. At Fraser Hill collected by Mrs. Smith at about 4000 feet.

Dennstaedtia moluccana Moore, var. **sinuata** Bonaparte; van Alderwerelt p. 146.

A scrambling fern with aculeate rachis found on the cleared hilltop of South Summits at Fraser Hill in a thicket of *Pteridium*, *Gleichenia*, etc. (8817) has been identified as above by H. H. Prince

R. Bonaparte. *D. moluccana* has a distribution in Malaysia, Fiji and Formosa; no other record of it from the Peninsula is known.

Hypolepis tenuifolia, Bernh.; van Alderwerelt, p. 336.

This species is distributed from Malaysia to Australia, Polynesia and New Zealand, and occurs also in southern China. The only specimens in the Singapore herbarium from the Peninsula are from Fraser Hill, collected by Mr. Hose, Mr. Smith and the present writers (8498). It appears doubtful however whether Beddome's *H. punctata* from the Taiping Hills (Beddome, Suppl. p. 19) is really distinct from the present species, as the only difference seems to be in the character of the hairs on the rachis and leaflets. *H. tenuifolia* from Fraser Hill is rather densely covered with viscid glandular hairs.

Histiopteris incisa, J. Sm.; van Alderwerelt, p. 349; *Litobrochia incisa* Pr., Ridley p. 25, Beddome p. 120.

Pantropical. In Ceylon and southern India it occurs on the hills at 3-1000 feet, and on the Khasya Hills to 6500 feet. In Java it extends from the plains to the highest summits. In the Peninsula it has been collected on the Taiping Hills, G. Kerbau, Kedah Peak, and on the Islands of Penang and Singapore. At Fraser Hill it is abundant in the open, young plants being very abundant by the paths, and both the typical form and Beddome's var. *integrifolia* (8499) occur. The latter variety has only been collected previously in Perak.

Pteridium aquilinum (L.) Kuhn.; van Alderwerelt, p. 377; *Pteris aquilina* L., Ridley p. 21, Beddome p. 115.

Distribution worldwide. Abundant in open places all over the Peninsula at all altitudes. At Fraser Hill forming dense thickets, with *Gleichenia* and other ferns, on the cleared hilltops.

Blechnum orientale, L.; van Alderwerelt, p. 387, Ridley, p. 26, Beddome p. 132.

Distributed generally through tropical Asia and through Malaysia to Polynesia and Australia. In southern India it is found on the hills up to 6000 feet, and in Java from sea level up to the summit of G. Gedeh. In the Peninsula it grows only in the open, and is very common almost everywhere. At Fraser Hill young plants are very abundant on newly cleared ground, especially by paths in the jungle (8493).

Diplazium subserratum, Moore; van Alderwerelt, p. 400, Ridley p. 29, Beddome p. 174.

Known only from the Peninsula, Java and Borneo. In Java it is a ground fern of the lower forest zone (3000-5000 feet); in the Peninsula it has been collected on the Taiping Hills, on the main range from Telom south to Ginting B'dai, and on Penang Island. At Fraser Hill, a ground fern of the forest, noticed once only (8902).

Diplazium sylvaticum, Sw.; van Alderwerelt, p. 402, Ridley, p. 30, Beddome p. 177.

A pantropical species. In Java, Racciborski records it from the woods of the low country only. It has been found on the Lankawi Islands, on the Taiping Hills, on the main range at G. Berumban and Bukit Kutu, and at lower altitudes in Pahang, Selangor, Malacca and in Singapore Island. At Fraser Hill it is of local occurrence, a ground fern of the jungle (8818).

Diplazium bantamense, Bl.: van Alderwerelt, p. 405, Ridley, p. 30, Beddome p. 177.

In southern and northern India and southern China, and through Malaya to the Philippines and the New Hebrides. In Java it is a common ground fern of the lower and middle forest zones, rare in the low country; in the Peninsula it occurs on the Taiping Hills at 3000 feet, on the main range from Perak to Negri Sembilan, in Pahang, and at lower altitudes in Malacca and Singapore. A ground fern of the forest (10018).

Diplazium tomentosum, Bl.: van Alderwerelt, p. 414, Ridley p. 30, Beddome p. 179.

Confined to Burmah and western Malaya. In the Peninsula it is widely distributed in the lowlands, and also in the hills from Perak to Johore, and in Singapore Island; a ground fern of the forest. Locally abundant at Fraser Hill (8816).

Diplazium speciosum, Bl.; van Alderwerelt, p. 415, Ridley, p. 30, Beddome p. 178.

A Malaysian species (occurring also in Indo-China?), widely distributed in the Peninsula from Kedah to Singapore, both at low altitudes and on the hills, in forests (10019).

Diplazium polypodioides, Bl.; van Alderwerelt, p. 419, Beddome p. 184; *D. asperum* var. *polypodioides*, Ridley p. 31.

Distributed from Ceylon, southern and northern India through Malaya to the Philippines and to Australia. The distinction between this species and *D. asperum* as found in the Peninsula is not very marked; Ridley has included both as varieties of the same species, though Beddome separates them and considers *D. polypodioides* to be an extreme form of *D. latifolium*. The present specimen (8844), found in the valley near the stream, appears to be nearer typical *D. polypodioides* than others collected in the Peninsula, but has a decidedly rough stipe. The two species together have been found in Penang Island, at Ulu Bubong in Perak, and on the main range at Ulu Temengo and Ginting Sempah.

Diplazium cordifolium, Bl.; van Alderwerelt, p. 422; *Anisogonium cordifolium* Bedd.; Ridley p. 31, Beddome p. 191.

Distributed from tropical Africa through India and Malaya to Polynesia. In the Peninsula it has been collected chiefly on the hills, in Perak up to 5000 feet and on the main range at several points, but also at lower altitudes in Selangor and on Singapore Island. A ground fern of the jungle, found once only, just below 4000 feet by the valley path (8850).

Diplazium fraxinifolium, Pr.; van Alderwerelt, p. 423; *Anisogonium lineolatum* Mett., Ridley p. 31. Beddome p. 191.

Distributed through Malaysia and the Philippines, and also in Japan (van Alderwerelt). In the Peninsula it is a montane species, collected on the Taiping Hills at 3000-4000 feet, on the main range at Telom and G. Batu Puteh (2000-3000 feet) and on Penang Hill. At Fraser Hill a ground fern of the jungle (8799).

Diplazium proliferum, Thunberg v. **accedens** (Bl.); van Alderwerelt p. 424; *Anisogonium decussatum* Beddome, Suppl. p. 40, Ridley p. 31.

Found in tropical Africa and Madagascar, through Malaysia to Polynesia and northern Australia, but not in India. The only other records from the Peninsula are from the Taiping Hills up to 4500 feet and from Telom. Found once only, in moist ground by the valley path, rather in the open (8780).

Asplenium nidus, L.; van Alderwerelt, p. 439; *Thamnopteris nidus* Pr., Ridley p. 26. Beddome p. 137.

Occurs in Madagascar, in tropical Asia generally, and through Malaysia to Australia. It is common on trees throughout the Peninsula, and was of occasional occurrence at Fraser Hill.

Asplenium Scortechini, Beddome, Suppl., p. 27. Ridley, p. 27, van Alderwerelt p. 443.

Endemic and montane, previously collected on the Taiping Hill at 3000-4000 feet, and on the main range at G. Berumban in Pahang. An epiphyte, on tree trunks in the forest, not common (8776).

Asplenium normale, Don; van Alderwerelt, p. 453, Ridley, p. 27. Beddome p. 144.

On the mountains of southern India and Ceylon at 3000-6000 feet, the eastern Himalayas and Khasya Hill, in southern China, and through Malaysia to the Philippines and islands of the Pacific. In the Peninsula found on Kedah Peak, on the Taiping Hills at 3000 feet, and on the main range at Telom. At Fraser Hill fairly common on the ground and on trees near the ground (8464).

Asplenium tenerum, Forst.; van Alderwerelt, p. 458, Ridley, p. 28; Beddome p. 147.

In tropical Africa, Ceylon, and through Malaysia to the Philippines, New Guinea, and Polynesia. In the Peninsula widely distributed and not confined to the hills, found also on Singapore Island. At Fraser Hill it grows on the ground and on trees in the jungle (10020).

Asplenium caudatum, Forst.; van Alderwerelt, p. 460, Ridley, p. 28; Beddome p. 151.

A pantropical species. In the Peninsula it appears to be montane and has only been collected from the Taiping Hills at 2500-4000 feet. At Fraser Hill not common, an epiphyte in the jungle (10021).

Asplenium praemorsum, Sw.; van Alderwerelt, p. 470; *A. furecatum* Thb., Beddome p. 157.

A pantropical species, occurring on the mountains of southern India and Ceylon at 5-7000 feet, and in Java above 7000 feet. It has not previously been recorded from the Peninsula, but a single specimen growing epiphytically at Fraser Hill (8485) seems to be nearer to it than to any other species of *Asplenium*.

Asplenium nitidum, Sw.; van Alderwerelt, p. 471, Ridley, p. 29, Beddome p. 157.

Occurs in the forests of Ceylon and south India, on the Khasya Hills at 1000-4000 feet altitude, through Malaysia to the Philippines and in the Mascarenes. In Java it is found in the lower and middle forest zones up to 6000 feet. In the Peninsula it has been collected on the Taiping Hills up to 4000 feet, on the Tahan river, on Pulau Tioman, and at various localities in Johore and on Singapore Island. At Fraser Hill it is epiphytic, and not common (8905).

Phegopteris laserpitilifolia, Beddome, Suppl., p. 84, Ridley, p. 40, van Alderwerelt p. 494.

Endemic and montane. Collected only in Perak (no locality) and on the main range at Telom. A ground fern of the forest, found only once, on Lower North Ridge (8798).

Dipteris conjugata, Reinw.; van Alderwerelt, p. 523; *D. Horsfieldii*, Beddome p. 336, Ridley p. 44.

Throughout Malaysia, extending to the Philippines, New Guinea and Polynesia, and also in Formosa. In the Peninsula "on rocks by the sea, and also on mountain tops" (Ridley). It is found on all the hills in open places at about 3000 feet and upwards, and also on the shores of Singapore Island. At Fraser Hill it was found abundantly in exposed situations both below 4000 feet and on the summit of Pine-tree Hill (8738) the highest point reached (4800 feet). Young plants were noticeable in many places by the forest paths.

Ceropteris calomelanos, Und.; van Alderwerelt, p. 528; *Gymnogramme calomelanos* Klf., Ridley p. 48.

This fern is said to have been introduced into Malaysia through cultivation, its original home being tropical America and Africa. It has been collected at many widely separated localities in the Peninsula, the highest altitude recorded being 4000 feet on G. Kerbau. At Fraser Hill it grows abundantly in open places, and is one of the first vascular plants to establish itself on bare ground (8483).

Monogramme paradoxa, Beddome, p. 375, van Alderwerelt, p. 552; *M. junghuhnii* Hk., Ridley p. 48.

On the mountains of Ceylon and southern India, and through Malaysia to Polynesia and Australia. The only other specimens in the Singapore herbarium are from Penang and Singapore. At Fraser Hill it was collected once only, an epiphyte in the forest (8835), but may have been overlooked on account of its small size.

Vittaria elongata, Sw.: van Alderwerelt, p. 556, Ridley, p. 51, Beddome p. 404.

An epiphyte of the rain forests of tropical Africa and Asia, extending through Malaysia to Polynesia and Australia. In Java it does not occur above 5500 feet. In the Peninsula it is common everywhere, in the low country and the hills, probably up to the upper limit of forest. At Fraser Hill it is one of the most abundant epiphytic ferns, and as usual rather variable (8471).

Vittaria pusilla, Bl.; van Alderwerelt, p. 560; *V. falcata*, Kze., Ridley p. 51, Beddome p. 406.

Occurs in Ceylon, Malaysia, the Philippines and Australia. In Java it is an epiphyte of the middle and upper forest zones, amongst moss, and in the Peninsula it appears to be montane, having been found on the main range at G. Berumban in Pahang and Bujong Malacca, on G. Tahan, G. Benom and Mt. Ophir. At Fraser Hill it is a not uncommon epiphyte, sometimes found with fertile fronds less than 5 cm. in length (8461).

Taenitis blechnoides, Sw.: van Alderwerelt, p. 563, Ridley, p. 52, Beddome p. 410.

Occurs in Ceylon and in northern India, and through Malaysia to the Philippines, New Guinea and Polynesia. "Common in woods all over the Peninsula and very variable" (Ridley). At Fraser Hill it is very abundant, especially by paths in the forest, the simple form being most frequent and large pinnate fronds rare (8735).

Polypodium hirtellum, Bl.; van Alderwerelt, p. 582, Ridley, p. 41, Beddome, p. 305.

Found in Ceylon, Malaysia, the Philippines, and New Caledonia. In the Peninsula and in Java it is montane, an epiphyte of mossy tree trunks; it has been collected on Kedah Peak at 2,500 feet, on the main range at G. Berumban and G. Batu Putih (6,000 feet), on G. Tahan and Mt. Ophir. At Fraser Hill it was found only once (8767).

Polypodium cucullatum, Nees and Bl.; van Alderwerelt, p. 589, Ridley, p. 42, Beddome, p. 307.

Occurs on the hills of Ceylon and southern India at 3,000-5,000 feet, in Malaysia and Polynesia. In Java it is found as an epiphyte from the middle forest zone up to 9,000 feet. In the Peninsula it has been found on the Taiping Hills at 3,000 feet, and on the main range at Bujong Malacca and Bukit Kutu: the specimens so named from G. Tahan appear distinctly different. At Fraser Hill it was noticed only twice (8740), but is easily overlooked on account of its small size.

Polypodium subpinnatifidum, Bl.; van Alderwerelt, p. 590, Ridley, p. 42, Beddome Suppl., p. 86.

Recorded from the Peninsula, Java, and the Philippines (Copeland). In the Peninsula it has only been found on G. Kerbau, Ulu Semangkok and G. Tahan, but the distinction from

P. cornigerum does not seem well-marked. At Fraser Hill an epiphyte in the forest, abundant near Pine-tree Hill and at the highest point reached on G. Ulu Semangkok (8729).

Polypodium obliquatum, Bl.; van Alderwerelt, p. 600, Ridley, p. 42, Beddome, p. 311.

A common epiphyte in Ceylon, in southern India at 4,000-5,000 feet, in Malaysia and the Philippines. In the Peninsula apparently montane, having been collected on the Taiping Hills at 3,000 feet, at Temengo and Telom. At Fraser Hill it is an epiphyte in the forest (8782); observations as to its frequency are inadequate.

Polypodium mollicomum, Nees and Bl.; van Alderwerelt, p. 601; *P. fuscatum*, Bl., Ridley, p. 42, Beddome, p. 311.

This species is recorded from Ceylon and Malaysia. The specimens from Fraser Hill come nearest to it, but differ markedly from those from other localities, in the thinner translucent texture and great development of spreading hairs over the whole plant. Ferns from G. Tahan referred to *P. malaccanum* are in close agreement, differing from the type of the latter species from the top of Mt. Ophir. Other specimens referred to *P. mollicomum* are from G. Bubu and Kedah Peak. At Fraser Hill a fairly common epiphyte (8731).

Polypodium khasyanum, Hk.; van Alderwerelt, p. 603, Ridley, p. 42, Beddome, p. 308.

This species occurs on the Khasya Hills and in Assam at 3,000-4,000 feet, and in the Peninsula has been collected on the Taiping Hills at 4,000 feet, and on G. Pulai in Johore. At Fraser Hill it is an epiphyte, collected once only but possibly not infrequent (8486).

Polypodium serraeforme, J. Sm.; van Alderwerelt, p. 615; *Prosaptia Emersoni*, Pr., Ridley, p. 16, Beddome, p. 56.

Found on the hills of southern India and Ceylon, and through Malaysia to the Philippines and to Samoa. In the Peninsula it has been widely collected on the hills from Kodah Peak to G. Pulai in Johore, and at lower altitudes in Malacca and Selangor. At Fraser Hill collected by Mrs. Smith.

Polypodium contiguum, J. Sm.; van Alderwerelt, p. 616; *Prosaptia contigua*, Sw., Ridley, p. 17, Beddome, p. 56.

On the mountains of Ceylon and southern India and through Malaysia to Polynesia. In the Peninsula it has been collected on the Taiping Hills at 3,500 feet, at Telom, on Penang Hill at 2,000 feet, on G. Tahan, by the Tahan river and in Sungei Ujong. At Fraser Hill a fairly common epiphyte (8487).

Polypodium verrucosum, Wall.; van Alderwerelt, p. 619; *Goniophlebium verrucosum*, J. Sm., Ridley, p. 43, Beddome, p. 324.

Through Malaysia and the Philippines to New Guinea and Australia. In the Peninsula not confined to the hills, but collected from few localities. At Fraser Hill it is fairly common as an

epiphyte (8760), sometimes found growing beneath a larger fern, *Asplenium nidus* or *Pleopeltis heraclea*.

Polypodium argutum, Wall.: van Alderwerelt, p. 621; *Goniophlebium argutum*, Wall., Beddome, p. 323.

This species has a distribution in northern India and Luzon. Specimens collected at Fraser Hill in 1919 by Mr. C. Hose and at the Semangkok pass by Mr. Ridley have fewer pinnae than is normal but appear to be referable to it rather than to *P. amaenum* Wall.

Pleopeltis accedens, Bl.: van Alderwerelt, Suppl., p. 376, Ridley, p. 45, Beddome, p. 345.

From Malaysia to New Guinea and Polynesia. In the Peninsula an epiphyte of the hill forests, collected on the Taiping Hills at 3,000 feet, and on the main range from G. Kerbau to Ginting Sempah. At Fraser Hill it was found a few times, growing with *P. Wrayi* and *P. stenophylla* (10022).

Pleopeltis Wrayi, Beddome, Suppl., p. 93, van Alderwerelt, Suppl., p. 376, Ridley, p. 45.

This species has been recorded only from Sumatra and Borneo outside the Peninsula. It occurs on the Taiping Hills at 4,000-5000 feet on the main range from G. Kerbau to Fraser Hill, on G. Tahan and G. Benom. At Fraser Hill it is a common epiphyte (8462, 8488, 8733).

Pleopeltis peltata, Seert.: van Alderwerelt, Suppl., p. 376.

An endemic and montane species, closely allied to *P. superficiale* Bl., and no doubt originated locally from it. *P. peltata* has been found on the Taiping Hills at 3,000-4,000 feet, and on the main range at Telom and on G. Batu Puteh. At Fraser Hill it grows epiphytically in the forest, and was noticed two or three times only (8732).

Pleopeltis stenophylla, Moore.: van Alderwerelt, Suppl., p. 379, Ridley, p. 45, Beddome, p. 348.

In Malaysia, the Philippines and Fiji; in Java an epiphyte of the lower forest zone. In the Peninsula "high up on lofty trees in the low country, on rocks and low trees in the hills" (Ridley). It has been collected on Kedah Peak, on the Taiping Hills at 3,000 feet, at the Semangkok pass, in Johore and on the Islands of Penang and Singapore. At Fraser Hill a common epiphyte (8828).

Pleopeltis subcaudiformis, v. A. v. R., Suppl., p. 384. *Polypodium heterocarpum*, Mett. var. *abbreviatum*, v. A. v. R., p. 677.

Distribution, Malaya (van Alderwerelt). In the Peninsula collected only at Fraser Hill where it is one of the less common epiphytes. The identification is from description only (8834).

Pleopeltis platyphylla, Beddome, Suppl., p. 94, van Alderwerelt, Suppl., p. 386, Ridley, p. 46.

Confined to western Malaysia. In the Peninsula it is montane, having been collected on Kedah Peak, on the Taiping Hills, and

on the main range at Telom and Ginting Sempah. At Fraser Hill it was found once as an epiphyte (a small sterile specimen) and abundantly on the rocks of the mining valley near the stream (8768).

Pleopeltis rupestris, Moore; van Alderwerelt, Suppl., p. 387, Ridley, p. 46, Beddome, Suppl., p. 94.

An epiphyte, confined to Malaysia and the Philippines. In the Peninsula it has been collected only on the Taiping Hills at 3,000 feet and on G. Inas in Perak at 5,000 feet. At Fraser Hill only one small specimen was collected.

Pleopeltis incurvata, Moore; van Alderwerelt, Suppl., p. 399, Ridley, p. 47, Beddome, p. 364.

An epiphyte, confined to Malaysia and the Philippines. In Java it occurs in the lower forest zone. In the Peninsula it is montane, and has been found on Kedah Peak, the Taiping Hills, on the main range from Bujong Malacca to Bukit Hitam in Selangor, and on G. Tahan. At Fraser Hill it is abundant (8484).

Pleopeltis laciniata, Beddome, Suppl., p. 97, Ridley, p. 47, van Alderwerelt, Suppl., p. 399.

Confined to western Malaysia and Celebes. In Java it is an epiphyte of the lower and middle forest zones. In the Peninsula it has been found on the Taiping Hills at 3,500-5,000 feet, and on G. Tahan at 5,000-6,000 feet. At Fraser Hill it was found once only, on South Summits, on the ground in the forest (8815), but probably it is usually epiphytic.

Pleopeltis sp. nov. ? No. 8789. An epiphyte, found once only. It has a pinnatifid frond, like that of *P. laciniata*, but with more distant segments, and scattered superficial sori. Represented also in Mr. Hose's collection.

Pleopeltis heraclea, (Kze.) ; van Alderwerelt, Suppl., p. 403; *Drynaria heracleum*, Moore, Ridley, p. 45, Beddome, Suppl., p. 93.

Occurs throughout Malaysia and in New Guinea. In Java it is a common epiphyte of the lower, and less common in the middle forest zone. In the Peninsula it has been collected on the Taiping Hills at 3,000-4,000 feet, and on Penang Hill. At Fraser Hill it is a common epiphyte (8764), and was found also creeping over the rocks in the cleared mining valley.

Lecanopteris carnosula, Bl.; van Alderwerelt, Suppl., p. 407, Ridley, p. 10.

Confined to Malaysia and the Philippines. In the Peninsula this species is montane, and has been found on the Taiping Hills at 3,000-5,000 feet, on the Telom ridge, and on G. Tahan at 3,000-5,000 feet. Specimens from Singapore referred to this species have scaly rhizomes and medial sori, characteristic of *L. lomarioides*. At Fraser Hill branches of trees were frequently seen covered with the black tuberculous rhizome of this myrmecophilous fern, but well-developed fertile fronds were not often found (8728).

Cyclophorus flocciger, Pr.; van Alderwerelt, p. 687; *Nipholobus fissus*, Beddome, p. 330.

This species occurs on the hills of southern India and Ceylon, in northern India and Malaysia to the Philippines. It has not been definitely recorded from the Peninsula, and the present specimens (8170, 8769), whose fertile fronds are immature, are referred rather doubtfully to it.

Stenochlaena sorbifolia, J. Sm.; Ridley, p. 53, Beddome, p. 123.

A pantropical species, remarkable for the small and variable much-divided sterile leaves which are usually borne by the lower part of the climbing stem. It is distributed throughout the Peninsula and is very abundant at Fraser Hill (8459), but was never found with fertile leaves.

Hymenolepis spicata, Pr.; van Alderwerelt, p. 728; *Gymnopteris spicata*, Beddome, p. 132, Ridley, p. 54.

In Madagascar, Ceylon and southern India, northern India at 4,000-7,000 feet, to southern China, and through Malaysia to Polynesia and Australia. In Java it is found up to 10,000 feet. In the Peninsula it has been found on the Taiping Hills at 3-4,000 feet, on Kedah Peak, on the main range from Telom to Fraser Hill, and on Penang Island and Pulau Tioman. At Fraser Hill it one of the less frequent epiphytes (8766).

Photinopteris speciosa Bl.; van Alderwerelt, p. 731; *P. rigida* Bedd.; Ridley p. 55, Beddome p. 442.

Confined to Malaysia and the Philippines. In Java it is an epiphyte of the lower forest zone, at 1500 to 4000 feet. In the Peninsula "on boughs of trees, overhanging rivers and mangrove swamps" (Ridley); it has been collected in Singapore and Johore, on Penang Hill, and on the Taiping Hills at 300-2000 feet. At Fraser Hill it was found only in the mining valley, on rocks in the open (8845).

Cheiropleuria bicuspis Pr.; van Alderwerelt p. 732; *Chrysodium bicuspe* Hk., Ridley p. 55.

Occurring throughout Malaysia, extends to the Philippines, Formosa and New Guinea. In Java it is a rare ground fern, found at 5000 feet; in the Peninsula it is found on the Taiping Hills, on the main range from G. Kerbau to Fraser Hill, on G. Tahan and Mt. Ophir. At Fraser Hill found once only (8482), on the ground in the forest on North Ridge.

Leptochilus heteroclitus C. Chr.; van Alderwerelt p. 739; *Gymnopteris flagellifera* Beddome, p. 433, Ridley p. 54.

Generally distributed through tropical Asia, and through Malaysia to the Pacific. In the Peninsula found at low altitudes in Johore and Singapore, at Gopong in Perak, and in Penang and Lankawi Islands; it grows in wet ground in forests. Mrs. Smith sent a small fertile specimen from Fraser Hill labelled "on log over stream, 4000 feet," which is probably referable to this species.

Ophioglossum pendulum L.; van Alderwerelt p. 777, Ridley p. 59, Beddome p. 465.

Occurs throughout southern Asia, Malaysia, Polynesia and northern Australia. In the Peninsula it is probably of general occurrence, but has only been collected on the Islands of Singapore and Penang, at Rawang in Selangor, and on G. Batu Puteh. At Fraser Hill it was noticed only twice, once hanging below *Asplenium nidus* (8761).

Angiopteris evecta Hoffm.; van Alderwerelt p. 762, Ridley p. 58, Beddome p. 460.

Distributed from Madagascar, Ceylon and southern India, through northern India to southern China and Japan, and through Malaysia to Polynesia and Australia. In Java it is a common ground fern of the lower forest zone, and in the Peninsula is probably of general occurrence, but has only been collected on the Taiping Hills (up to 3000 feet), at Temengo and Telom, at Pekan, and on Singapore Island. At Fraser Hill, found only in the mining valley below 4000 feet, in shady places, becoming abundant at about 3500 feet (8847).

FERN ALLIES.

Selaginella atroviridis Spring; Ridley Fern Allies p. 153.

Distributed from British India and China to New Guinea, and collected from many localities in the Peninsula, from Perak to Singapore, not confined to the hills. At Fraser Hill it is abundant on the ground in the forest (8153).

Selaginella brachystachya Spring; Ridley Fern Allies p. 159.

In south India and Ceylon, and in western Malaysia. In the Peninsula it appears to be montane, being found on the Taiping Hills, at Telom, and on G. Tahan. At Fraser Hill noticed only by the path to the Gap. (8822).

Selaginella Wallichii Spring; Ridley Fern Allies p. 153.

Distributed from Assam through Malaysia to New Guinea. In the Peninsula collected at many localities in lowland forests, and on the hills up to 3-4000 feet. At Fraser Hill not abundant (8819).

Lycopodium cernuum L.; Ridley Fern Allies p. 144.

A species of worldwide distribution, abundant everywhere in the Peninsula. It is one of the first vascular plants to establish itself on new ground in exposed places, notably on levelled house-sites.

Lycopodium phlegmaria L.; Ridley Fern Allies p. 143.

Paleotropical, and in Queensland and New Zealand. In the Peninsula it has been found in many localities, at altitudes up to 5000 feet (G. Kerbau). At Fraser Hill it is frequent, but not abundant (8788).

MOSSES.

Acanthocladium scabrifolium Broth. No. 8730. "Agrees with the description quite well. It has only been found once before, in Java; cf. Hedwig. LX, 327 (1819). The fruit has never been described." (Dixon).

Braunfelsia sp. nov. No. 8838. The leaves are closely imbricated, and the plant having a tufted habit was saturated with water like a sponge. Found on a tree by the path to Pine-tree Hill.

Ctenidium sp. nov. No. 8715 d. Closely allied to *C. stereodontoides* Dixon from S. India.

Dicranoloma sumatrana Broth. This species, otherwise only known from Sumatra, was collected by Mr. Ridley at Sempang mines.

Distichophyllum Mittenii Bry. jav. Nos. 8708, 8712. Distribution; Ceylon, Java, New Caledonia. Previously found on the Taiping Hills and Ulu Temengo in Perak, and at Kukub in Johore. On a log in deep shade in Reservoir Valley.

Ectropothecium Moritzii (C.M.) Jaeg. No. 8713. Distribution; Java, Borneo, Celebes. Collected also on Penang Hill and G. Tampin.

Endotrichella elegans (Doz. & Molk.) Fl. No. 8821. Distribution; Sumatra, Java, Celebes, Philippines. Previously found on the main range at G. Kerbau and Telom.

Isopterygium albescens (Schwaeg.) Jaeg. No. 9181. Distribution; Nilghiris, Himalayas from Nepal to Assam, Java, Borneo, Celebes, Japan. Previously found at Batu Caves, Selangor, and in the Botanic Gardens, Singapore.

Pogonatum convolutum (L.) var. **cirratum** (Brid.) Par. No. 8169. A new record for the Peninsula.

Pogonatum macrophyllum Bry. jav. No. 8167. Distribution; Java, Sumatra, Batjan. Apparently a montane species in the Peninsula being found on the Taiping Hills, on the main range from G. Berumban and Bujong Malacca to Bukit Hitam, on G. Benom, Mt. Ophir and the hills of Penang. Abundant at Fraser Hill.

Pogonatum Neesii C. M. Nos. 8158, 8116. Found by Mr. Ridley at or near Fraser Hill, this species has not been recorded elsewhere in the Peninsula; it is known from the Nilghiris and Java. It is the first plant to colonise the bare ground of levelled house-sites and is very abundant.

Rhacelopus pilifer D. & M. No. 8772. Distribution; Tonkin, Java, Borneo, Batjan, New Guinea. This species is recorded from the Taiping Hills and from several points on the main range from Perak to G. Tampin. Not uncommon in the jungle on rocks and also on bare ground by paths.

Rhizogonium spiniforme (L.) Bruch. No. 8168. Occurs everywhere in mountain forests of the tropics and subtropics, and

is widely distributed in the Peninsula from Kedah to Singapore, not confined to the hills.

Schistomitrium apiculatum D. & M. No. 8823. A Malaysian species, not recorded from other localities in the Peninsula. Collected on a tree in the forest on South Summits.

Sematophyllum sp. nov. No. 8111. Found on a tree in Reservoir Valley.

Sematophyllum secundum (Rw. and Hornsch.) var. **angustifolium** Fl. Nos. 8398, 8715 e, 8741, 8910. This variety occurs also on G. Raya, Lankawi Islands; at Fraser Hill it was abundantly fruiting. *S. secundum* is a Malaysian species, and has been found on G. Kerbau and Penang Hill.

Sematophyllum sigmatodontium (C. M.) Jaeg. Distribution; Java, Sumatra, New Guinea. This species was found by Mr. Ridley at or near Fraser Hill, and has also been collected on Penang Hill and on G. Tunduk, Malacca.

Taxithelium capillipes (Bry. jav.) Broth. No. 8454. Distribution; Sumatra, Java. It has been found on Penang Hill and in mangrove, amongst *Acrostichum aureum*, at Port Swettenham.

Trichosteleum Boschii (D. & M.) Jaeg. Nos. 8715 b, 8783. Distribution; Siam and western Malaysia. This species has been collected on the hills of Perak and Penang, in the Telok Reserve, Klang, and on G. Pantai in Johore.

Trichosteleum hamatum (D. & M.) Jaeg. Nos. 8709, 8715 c, 8781. Distribution; Malaysia and the Philippines. New to the Singapore collection.

Trichosteleum sp. nov. No. 8715 a. Found in Reservoir Valley, in a tuft consisting of *T. Boschii*, *T. hamatum*, etc.

Trismegistia rigida (Rw. & H.) Broth. No. 8399. A Malaysian species, extending to New Guinea and New Caledonia; it has also been found on G. Raya, Lankawi.

I. H. BURKILL.

R. E. HOLTUM.

RAINFALL

at the Director's house, Botanic Gardens, Singapore, during the first half year, 1921.

Readings taken always at 8 a.m. and credited to the date in which the twenty-four hours began.

Date	January.	Feb.	March.	April.	May.	June.
1	.14	.02	nil	.87	.58	.38
2	.23	nil	..	.78	.10	.60
3	.64	.01	..	1.21	.65	.39
4	.02	.03	.11	nil	trace	.02
5	1.98	.97	.48	..	2.13	.47
6	.17	.17	.17	.85	nil	.11
7	.01	1.52	.09	.29	..	.02
8	1.35	.13	.06	.24	.15	.18
9	4.93	.05	1.60	.43	.79	.01
10	.78	.20	1.40	nil	.94	.03
11	.23	.13	.03	.07	.01	1.15
12	nil	2.92	1.55	.04	.01	.09
13	.01	.23	.53	trace	.02	.05
14	.23	.01	1.21	nil	trace	nil
15	.01	1.03	trace	.02	.44	..
16	nil	.01	nil	trace	.02	.11
17	..	trace	..	nil	.45	nil
18	.53	nil	..	1.11	.41	..
19	1.93	.02	..	.21	nil	..
20	1.12	.02	..	.55	1.58	..
21	1.27	nil	.10	.55	.29	..
22	.01	..	nil	nil	.23	.18
23	.01	trace	.52	..	.18	nil
24	nil	.18	.07	2.24	nil	.42
25	.13	.08	nil	.05	..	.02
26	nil	nil	.48	.55	.28	nil
27	..	..	.10	1.64	.02	.18
28	..	..	..	.03	nil	.05
29	.29	..	.30	.05	.01	nil
30	8.77	..	.02	.04	nil	..
31	.01	..	nil	..	nil	..
	24.80	7.73	8.85	11.85	9.29	4.46

RAINFALL

at the Director's house, Botanic Gardens, Singapore, during the second half year, 1921.

Readings taken always at 8 a.m. and credited to the date in which the twenty-four hours began.

Date	July.	August.	Sept.	October.	Nov.	Dec.
1	nil	nil	1.86	trace	.07	.02
2	trace	..	1.08	nil	trace	nil
3	nil	trace	.58	trace	..	.37
4	..	.01	.02	nil	.28	.65
5	nil	.07	.03	..	2.74	.37
6	.91	nil	nil	..	trace	.39
7	.03	..	.06	..	nil	nil
8	.73	..	nil	..	.14	.05
9	.02	..	..	.62	trace	nil
10	trace	..	.27	2.26	nil	..
11	..	..	.03	nil	..	..
12	nil	.83	.05	.15	1.67	..
13	.51	nil	.02	nil	.37	..
14	2.49	.42	.03	.17	nil	.03
15	.06	.03	.22	nil	.29	.15
16	.02	nil	.01	.89	.40	.09
17	trace	1.04	.01	.06	.90	.08
18	nil	.06	.02	.91	trace	.48
19	..	2.15	2.07	1.42	..	nil
20	..	trace	trace	.15	2.03	1.05
21	..	.13	nil	.28	.03	nil
22	..	.01	..	nil	.03	trace
23	trace	nil	.29	.19	.06	nil
24	nil	.01	.07	nil	nil	..
25	..	.03	.57	.09	.36	.64
26	..	.11	trace	.08	.64	.03
27	.37	nil	1.20	.66	.33	trace
28	trace	..	1.50	.16	1.19	.12
29	nil	.01	.42	.87	.12	.03
30	..	1.56	nil	.06	trace	.38
31	..	.32		1.92		.23
	5.14	6.79	10.41	13.94	11.65	5.16

RAINFALL

at the Director's house, Botanic Gardens, Singapore, during the first half year, 1922.

Readings taken always at 8 a.m. and credited to the date in which the twenty-four hours began.

Date	January.	Feb.	March.	April.	May.	June.
1	.01	1.12	.11	nil	.01	.52
2	nil	.24	.96	.11	nil	1.57
3	.01	.09	.01	nil	trace	nil
4	.44	nil	.16	.06	.06	..
5	.12	1.01	.08	nil	trace	..
6	.02	nil	nil	trace	nil	trace
7	.64	..	..	1.01	..	nil
8	trace	.49	.20	nil	..	.01
9	.23	.34	.12	..	2.76	nil
10	nil	.49	.84	.11	.24	.21
11	.62	2.69	.07	.11	nil	.01
12	.01	.02	nil	1.24	trace	trace
13	nil	1.06	.81	.06	.06	.09
14	.11	.07	.07	.36	.01	.01
15	.32	nil	nil	1.26	.77	.18
16	trace	..	..	.15	trace	.19
17	..	trace	.47	1.38	.06	trace
18	.53	nil	.14	.04	3.06	.09
19	.10	..	nil	.29	.02	.04
20	1.39	..	.02	nil	1.08	.32
21	1.02	..	.04	trace	nil	.11
22	.31	..	.10	nil	.07	.03
23	.12	trace	.88	trace	.50	3.89
24	.93	.01	.39	nil	trace	.02
25	.10	.08	1.84	..	.18	trace
26	nil	.07	.02	..	nil	nil
27	..	.20	.32	..	1.49	trace
28	trace	.20	.01	..	.03	nil
29	nil	..	.20	..	.01	..
30	..	..	trace	.17	trace	..
31	..	..	nil	..	nil	..
	6.96	8.21	7.86	6.35	10.41	7.29

RAINFALL

at the Director's house, Botanic Gardens, Singapore, during the second half year, 1922.

Readings taken always at 8 a.m. and credited to the date in which the twenty-four hours began.

Date	July.	August.	Sept.	October.	Nov.	Dec.
1	nil	.14	nil	1.05	1.00	.01
2	..	.26	trace	.05	.09	.06
3	.05	nil	1.96	.31	.93	.62
4	.50	..	trace	.04	trace	nil
5	.06	..	nil	1.35	.11	..
6	.01	.43	.16	.09	.78	1.49
7	.90	trace	trace	.01	.05	1.12
8	.02	nil	1.53	.18	nil	trace
9	.08	.41	.04	trace	.04	nil
10	.03	nil	nil	nil	.07	.65
11	nil	.09	.02	.04	.25	.07
12	..	.47	nil	nil	.01	nil
13	.02	.16	..	..	.23	.23
14	.23	.92	..	..	nil	.01
15	.82	.15	..	..	..	.08
16	nil	.05	..	..	..	.91
17	..	.61	..	.68	.27	.03
18	.28	nil	..	nil	2.91	.20
19	.01	..	..	..	.11	1.05
20	nil	.08	..	.02	.43	.01
21	..	.80	..	.34	trace	.41
22	trace	.53	..	.40	nil	.16
23	nil	1.73	..	1.45	.02	nil
24	..	.52	.52	.74	2.39	.59
25	trace	3.72	.86	nil	trace	nil
26	nil	2.66	nil	.09	.81	..
27	..	.02	1.56	.08	.35	.01
28	..	.19	trace	trace	.35	nil
29	..	.04	1.48	nil	.72	..
30	..	1.10	1.28	..	1.33	..
31	..	.08	..	.40	..	.59
	3.01	15.16	9.41	7.32	13.25	8.30

RAINFALL

at the head of the Waterfall Gardens, Penang, during the first half year, 1921.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours began; the registration kindly put at the service of the Gardens by the Municipality of George Town, Penang.

Date.	January.	Feb.	March.	April.	May.	June
1	nil	.05	nil	.06	nil	.15
2	.70	1.12	..	nil	.15	.75
3	.14	.03	.14	..	.35	.03
4	.04	nil	.18	..	1.60	nil
5	.10	.43	nil	..	.92	2.07
6	.06	nil	..	..	.42	.03
7	.10	..	.10	..	.11	nil
8	.08	..	.19	..	.10	..
9	.03	..	.04	..	nil	1.86
10	nil	..	1.82	..	.70	nil
11	.04	..	.57	.46	.33	..
12	1.73	..	1.05	2.20	nil	.03
13	nil	..	1.24	.15	1.46	nil
14	1.83	..	.25	.72	1.05	..
15	nil	1.43	.23	nil	1.97	.04
16	..	nil	.33	.65	.50	.82
17	..	..	.22	1.99	3.14	nil
18	.25	..	.08	.62	.58	..
19	.06	..	2.60	.16	1.83	..
20	nil	1.59	.42	.04	.17	..
21	..	nil	1.98	nil	.16	..
22	..	..	.12	..	.06	.06
23	..	..	.53	..	nil	nil
24	..	..	.03	..	.02	..
25	..	..	.76	..	1.09	.34
26	..	..	.05	..	nil	.03
27	..	..	.16	1.30	.12	nil
28	..	..	.07	.19	..	..
29	.88	..	nil	.84	..	..
30	.06	..	..	.04	.05	..
31	nil	..	.57	..	.09	..
	6.10	4.65	13.73	9.42	16.97	6.21

RAINFALL

at the head of the Watertall Gardens, Penang, during the second half of the year, 1921.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours began; the registration kindly put at the service of the Gardens by the Municipality of George Town, Penang.

Date.	July.	August.	Sept.	October.	Nov.	Dec.
1	.05	.53	.82	.10	.62	nil
2	nil	.10	2.25	.23	2.50	..
3	..	nil	nil	.01	nil	..
4	.05	1.46	..	.07	..	1.69
5	5.02	.07	..	.07	.28	..
6	.33	nil	.97	1.68	.03	.19
7	nil	..	nil	nil	.18	nil
8	.22	..	..	.10	.04	..
9	.04	..	..	.02	.16	..
10	.14	..	..	.04	2.42	.32
11	nil	..	..	nil	.72	nil
12	1.56	..	3.60	.44	.02	..
13	.30	..	.11	.21	..	..
14	1.07	.95	.67	.33	1.38	..
15	.39	.68	5.66	.72	nil	..
16	.56	3.50	.31	1.87	..	..
17	.60	1.12	.36	1.02	..	..
18	nil	.02	2.55	1.79	.21	..
19	..	.59	2.85	1.44	.03	.41
20	.03	nil	1.33	nil	.20	.36
21	nil	..	nil	..	.08	nil
22	..	..	.25	.70	nil	..
23	..	..	.13	.96	..	..
24	..	..	nil	.43	.14	..
25	..	.58	.03	.19	.06	..
26	..	nil	1.89	.23	nil	.77
27	.06	.06	1.08	.42	..	.42
28	.80	.08	1.60	nil	.15	.20
29	nil	1.55	nil	1.84	nil	.05
30	.30	2.45	.01	.52	.22	nil
31	1.63	4.82		.81		..
	13.15	18.56	26.47	16.24	9.44	4.41

RAINFALL

at the head of the Waterfall Gardens, Penang, during the first half year, 1922.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours began; the registration kindly put at the service of the Gardens by the Municipality of George Town, Penang.

Date.	January.	Feb.	March.	April.	May.	June.
1	nil	.07	.91	nil	1.60	.19
2	..	.12	.06	..	.76	nil
3	..	.48	.51	..	.02	.35
4	.77	.06	.79	..	.74	.18
5	nil	.30	nil	.03	.85	.96
6	..	nil	.83	nil	nil	.05
7	..	..	nil	1.40	3.94	nil
8	..	..	.16	.11	2.95	..
9	.13	.15	nil	.69	.60	..
10	nil	.39	..	.04	.02	..
11	.11	nil	..	.80	1.62	..
12	nil	.30	..	.21	.05	..
13	..	nil	.01	.30	.42	.64
14	..	..	.03	.34	.05	.07
15	.81	..	.90	.22	.54	.29
16	nil	..	.60	.50	nil	2.15
17	.90	..	1.06	.13	.13	1.18
18	.04	..	.57	.46	.43	2.28
19	.27	..	.13	nil	.19	1.70
20	nil	..	.01	..	.03	.31
21	.07	..	2.43	..	.02	.12
22	.04	..	.02	..	nil	.35
23	nil	.20	1.25	.10	.12	nil
24	..	nil	1.29	nil	nil	..
25	..	.27	.22	..	.58	..
26	..	.21	nil	..	nil	..
27	..	.41	..	..	.49	..
28	..	nil	..	..	.02	..
29	..	..	..	.03	.16	.48
30	..	..	..	.22	nil	.07
31	..	..	..	..	1.92	..
	3.14	2.96	11.78	5.58	18.25	11.37

RAINFALL

at the head of the Waterfall Gardens, Penang, during the second half of the year, 1922.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours began; the registration kindly put at the service of the Gardens by the Municipality of George Town, Penang.

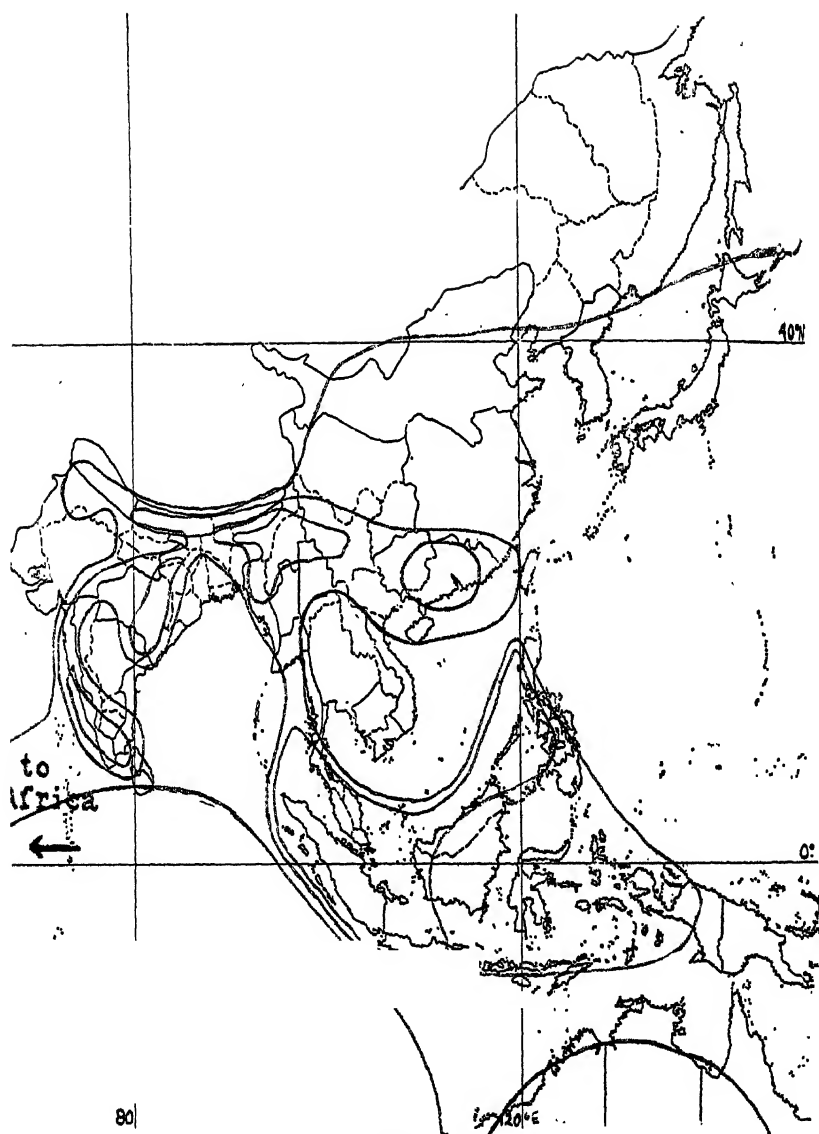
Date.	July.	August	Sept.	October.	Nov.	Dec.
1	.05	nil	.36	1.14	.10	nil
2	2.17	..	1.55	.02	.50	1.05
3	nil	..	.77	.27	.90	.08
4	.18	..	.29	.55	1.22	.58
5	.02	.21	nil	.03	.10	.09
6	nil	.03	..	.32	.08	1.37
7	.10	.04	1.30	.03	.35	nil
8	nil	nil	.50	.23	.23	..
9	..	..	.45	.25	.14	..
10	.17	3.24	nil	.60	.23	.22
11	nil	1.73	.23	.17	1.25	.17
12	.56	.33	1.11	2.56	.62	nil
13	1.62	.07	.32	.04	5.66	.25
14	.02	nil	nil	.10	.53	nil
15	nil	1.00	.82	.02	.32	.24
16	.52	.05	.42	.47	.77	1.62
17	.96	nil	.41	.08	.04	.07
18	.11	..	1.14	.66	nil	.75
19	nil	.55	nil	nil	.25	1.80
20	..	4.30	..	..	..	1.00
21	..	nil	..	.55	..	1.03
22	..	.02	..	.56	.05	.50
23	.20	.32	.92	.08	.22	nil
24	nil	.12	2.06	.38	.10	.70
25	..	nil	2.60	.16	nil	nil
26	..	.43	2.53	.29	.20	.12
27	..	nil	2.09	.27	.42	nil
28	..	1.44	.35	.87	nil	.06
29	..	nil	nil	.09	..	.92
30	..	..	.91	nil	.66	nil
31	..	..	..	..	..	1.70
	6.68	13.88	21.13	10.79	15.24	14.32

SUMMARY OF RAINFALL, 1921.

	SINGAPORE.			PENANG.		
	No. of rainy days.	Amount of rain in inches.	Longest Spell without rain.	No. of rainy days.	Amount of rain in inches.	Longest Spell without rain.
January ..	24	24.80	3	15	6.10	9
February ..	19	7.73	3	6	4.65	9
March ..	18	8.85	5	25	13.73	2
April ..	21	11.85	2	14	9.42	9
May ..	21	9.29	2	24	16.97	2
June ..	19	4.46	5	12	6.21	5
July ..	9	5.14	10	18	13.15	6
August ..	16	6.79	6	16	18.56	8
September ..	22	10.41	3	19	26.47	5
October ..	17	13.94	8	26	16.24	2
November ..	18	11.65	3	19	9.44	3
December ..	18	5.16	5	9	4.41	8
Total ..	222	120.07	..	203	145.35	..
Greatest amount in 24 hours .. 8.77				5.66		
do. do.	48	do. .. 9.06	7.27			
do. do.	72	do. .. 9.07	8.82			
Excessively rainy periods, more than 5.00 in. having fallen in 72 hours. (both in January) .. 2				5 (March, July, August) (twice) and September)		
No. of days when the condition existed .. 6				15		
Periods of comparative drought, less than 0.02 in. having fallen in 120 hours .. 8				12 (every month except May, October and Nov.)		
(Feb, June, June July, July, July-August, September, October, December.) .. 22						
No. of days when condition persisted .. 22				36		
Longest of the dry spells .. 10 days				10 days.		

SUMMARY OF RAINFALL, 1922.

	SINGAPORE.			PENANG.		
	No. of rainy days.	Amount of rain in inches.	Longest spell without rain.	No. of rainy days.	Amount of rain in inches.	Longest Spell without rain.
January ..	19	6.96	6	9	3.14	9
February ..	16	8.21	9	12	2.96	10
March ..	23	7.86	2	19	11.78	10
April ..	14	6.35	10	16	5.53	5
May ..	17	10.41	4	25	18.25	1
June ..	16	7.29	6	17	11.37	6
July ..	18	8.01	12	18	6.68	12
August ..	23	15.16	2	16	13.88	(to Aug. 4) 3
September ..	10	9.41	12	21	21.13	4
October ..	18	7.82	5	27	10.79	2
November ..	22	13.25	3	24	15.24	2
December ..	20	8.30	3	21	14.32	3
Total ..	211	108.53	..	220	135.12	..
Greatest amount in 24 hours ..	3.89				5.66	
do. do. 48 do. ..	6.38				6.89	
do. do. 72 do. ..	6.91				7.53	
Excessively rainy periods, more than 5.00 in. having fallen in 72 hours ..	1			5 (May, June, August September, November)		
No. of days when the condition existed ..	3			10.		
Periods of comparative drought, less than 0.02 in. having fallen in 120 hours ..	8			7 (January, February, March, April. * April, June (2), July-August).		
(Jan., Feb., April, June (2), July, Sept, Oct.)						
No. of days over which the condition existed	35			30.		
Longest of the spells ..	12 days			12 days.		



80

MAP NO. 1

Map 1. The distribution in Asia of *Dioscoreas* of the section *Enantiophyllum*, a section of edible species furnishing in *D. alata* and *D. opposita* two important cultivated plants. There are five areas in Asia of greatest abundance, (1) Malabar, (2) Ceraus-Chota Nagpur, (3) the Assam-Burmese hills, (4) South-eastern China and (5) Western Malaysia with the Philippine islands.

THE
GARDENS' BULLETIN,
STRAITS SETTLEMENTS.

Vol. III

Issued April 15, 1924.

Nos. 4-6.

**A list of Oriental Vernacular Names
of the genus *Dioscorea*.**

COMPILED BY I. H. BURKILL.

For a considerable period the writer of these pages has been engaged on a botanic and economic study of the oriental species of the genus *Dioscorea*, and has collected at first, and at second hand, much native opinion upon them. In the course of doing this, the following list of their oriental names has been compiled. It is printed in the belief that used as a quarry of statements meant for examination it can be of considerable ethnological value. It is, in its present form, uncritical; for it contains names as heard from the lips of untutored men speaking a variety of distinct languages; and, obviously, it embodies what a purist would consider their mistakes. But languages are largely made up of mistakes persisting and it is not a purpose of the list to hide them, but to lead to an explanation of them.

As a consequence of its second-hand sources, it is unavoidably inconsistent in the values of letters; but contains a number of explanatory cross-entries. In the names from Dutch sources "oe" has been turned into "u" "dj" into "j," and "tj" into "ch:" in northern Indian names, á has its Hunterian value: c, k and q have been gathered together: cross-references give the Portuguese values of some of the consonants of Fijian; a phonetic spelling (English values) is given for Chinese ideograms; but it has not been thought well to make any change in the French spelling of the names from New Caledonia, etc. Mistakes such as arise from a Burman using Hindustani, or a Sakai using his clipped Malay are, when recognised, explained.

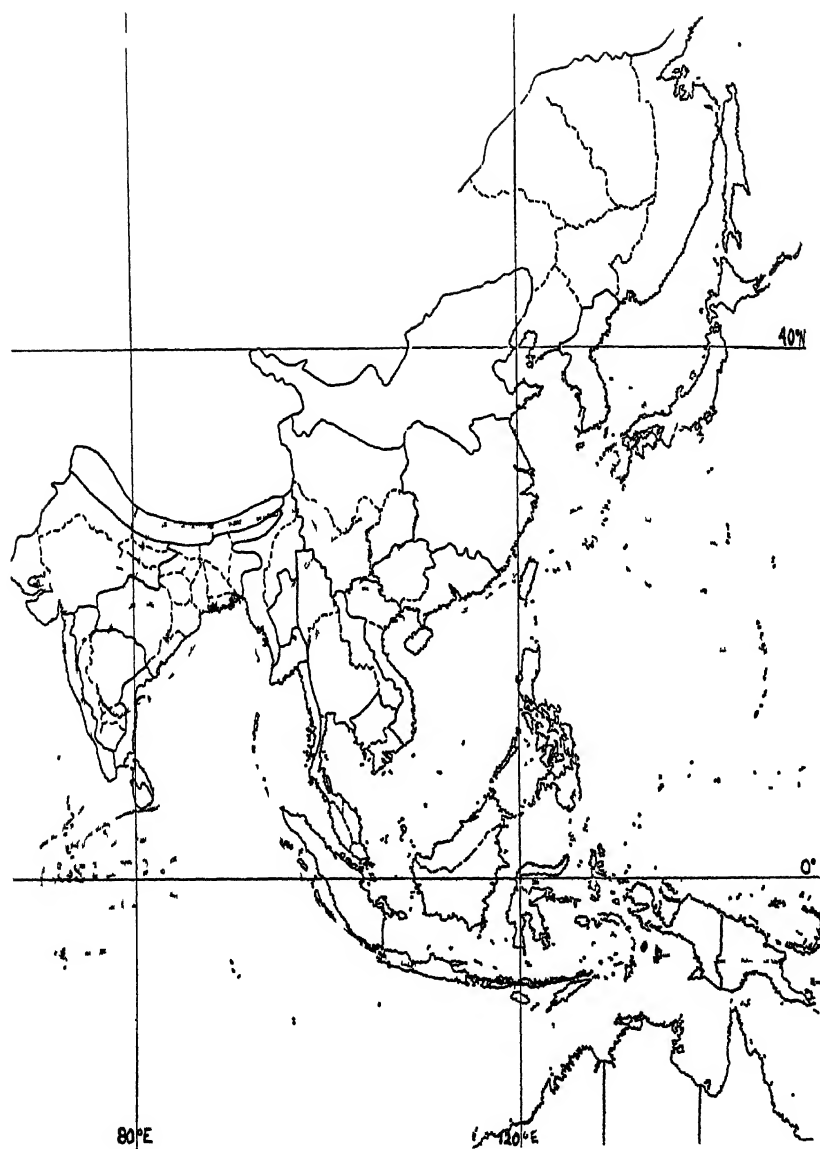
It is a matter of regret to the writer, that the list does not cover the names of all starchy tubers used as food in the East; but of Dioscoreas only. However, Dioscorea in *D. alata* yields one of the most important of these foods, and has long done so: it supplies in *D. opposita*¹ a sub-tropical tuber of importance: it furnishes in *D. esculenta*² another tropical food; and in the edible cultivated races of *D. bulbifera* and *D. pentaphylla* are two more useful plants. All bear the marks of selection and improvement by human agency. It is indubitable that the improvement has been directed in the East. Besides these cultivated yams, thirty more wild species of the genus are proved to be turned to account as famine foods, and as knowledge grows that number is likely to be doubled.

In comparison with the use as food, the other uses which oriental Dioscoreas have, are relatively unimportant. There is the medicinal use of some species in China and elsewhere; there is the tanning use of *D. rhipogonoides* and *D. cirrhosa* on the coasts of southern China, Tonkin and Annam; and there is the use of *D. deltoidea* in the North-western Himalaya for wool-washing. The species which serve man as food-plants, are serviceable in very varying degree: *D. alata* returns on cultivation a considerable harvest, which is in the highest degree palatable: *D. opposita* and *D. esculenta* yield freely, and what they return is also wholly palatable: cultivated races of *D. bulbifera* and *D. pentaphylla* possibly return not grudgingly, but no European has tried to ascertain their yield per acre: the wild species of the section Enantiophyllum root deep and therefore return little to those seeking and getting them; but the root tubers when got are palatable: the wild and nauseous species of the sections Opsophyton and Lasiosphyton have to be eaten with caution, and are only used in want: and, lastly, the tuber of *D. hispida*³ is virulently poisonous, but the poison can be eliminated and a food extract made from it when greatly needed. The wide range in utility evident through this series gives abundant cause for discriminating names. Primitive man particularises: he may be expected to apply a different noun to each yam that he recognises. As his tribe advances, generalisation comes in; a noun is adopted for "yam:" and in a further generalisation a noun for "tuber." Doubtless this explains how related languages are often remarkably far apart in their words of generic rank e.g. for "yam" and for "tuber," for one tribe would take the noun of this species of yam and apply it to yams in general; and another tribe would take the noun of that yam. The nouns for "yam" and still more the nouns for "tuber" will be seen in these pages most diverse.

1 *D. opposita*, Thunb., is the oldest name for the Chinese yam, and must be given preference to the better known name, *D. Butatas*, Decne.

2 *D. esculenta*, Burk., is the proper name to give to the Lesser yam, which is *D. fasciculata*, Roxb., and the *D. spinosa* of various authors, and also one of the species which have been called *D. aculeata*.

3 *D. hispida*, Dennst., is the most acceptable name for the yam often called *D. dactyloides*, Roxb., and which is one of the species that have been called *D. triphylla*.



MAP No 2

Map 2 The distribution in Asia of the section *Combilum*, that is to say of the cultivated and edible *Dioscorea esculenta*. Also (at S) the distribution of the section *Shannicoia*.

The writer's interest is in man's gradual appropriation of the products of the jungle, and conversion of those that were pliable into cultivated plants. He hopes that etymologists upon their side can make use of the names which he has gathered together, and will find interest in revising them.

It would entrench the conclusions derived from studying the names of Dioscoreas to make a list covering all the oriental starchy food-roots, so that such as may have been transferred to Dioscoreas from aroids and from other useful plants, should appear with a suggestion whence they came: but to have made it would have entailed large digressions from the purpose in hand.

Climate circumscribes the area of the Dioscoreas in the East in a very marked way by means of deserts; for they are plants of summer-growth under a rainfall ranging from abundance to great abundance: and in consequence of this the regions about Persia, Arabia, Turkestan and in general all the parts of western Asia, are inimical to them, as well as the great plateau of the centre of the Continent and most of Australia.

Although it has grown abundantly clear of recent years that western Asia during, let us say the last third of the time since the Glacial period, has undergone a drying up from a more moist climate than it has now, and that therefore it may have been more suited or it were better to say, nearer to being suited to yams, it is so hopelessly impossible for them now, and so slow have been the climatic changes, that, brought into the same view as living languages, the climate towards the genus becomes permanent; and it is reasonable to assume that the absence of edible yams west of lines which can be realised in a moment from the accompanying maps, carries with it the certainty that living yam-names, even as misapplied names, are absent.

Of the maps Nos. 1 and 2 are the most important: No. 1 is of the species of the section *Euantiophyllum* of *Dioscorea*, whereof over 90 per cent furnish innocuous edible tubers: No. 2 gives the distribution of the section *Combilium*, which is as useful, (together with a section of unknown use): No. 3 is of the two sections *Opsophyton* and *Lasiophyton*, which furnish the most important oriental famine substitutes: and No. 4 is of the inedible species of the sections *Stenophora* and *Paramecocarpa*.¹ The reader will observe that the western limits of the sections on the first three maps are very similar,—namely a line from the Gulf of Cambay to the upper Ganges, with in two of them a bay westwards along the Himalaya. West of these limits it is unnecessary to search in Asia for any intimate knowledge of the *food*-Dioscoreas. Yet confident, as we may well be, that pre-European traffic or human migration westwards by land from the monsoon area of Asia has not stabilised

¹ *Paramecocarpa* is a new name for a section created to contain the species, *D. flabellifolia*, Prain and Burkill, *D. piscatorum*, Prain and Burkill, and a couple more which are closely allied. *D. piscatorum* is that species which is referred to as "tuba-ubi" in the Journal of the Asiatic Society of Bengal N.S. 10, (1914) p. 13.

any knowledge of yams in the direction of Europe, we must recognise, that peoples wandering westwards by sea, between India and the African coasts have been able to transport them. These peoples were firstly that Malayo-polynesian stock, which settled in pre-historic times in Madagascar reaching it assuredly by water, and secondly the Egyptian, Semitic, Indian, Arab and Chinese traders, who navigated the Indian Ocean prior to 1500 A.D.; for they must be assumed to have provisioned their vessels with yams.

It is reserved for workers in Africa to investigate this. They must ascertain what Asiatic yams are in cultivation within east Africa, and by recording their vernacular names seek tracks of the races which transported them. The whole field lies open, and if some student of plants and man can be found to take in hand the enquiry, results with this list should be obtainable rapidly.

It is interesting that the cultivation of the Guinea coast *D. cayensis* (African in spite of its name) and *D. rotundata* has not been recorded in east Africa and it appears as if they can never have been there and available for transport eastwards.

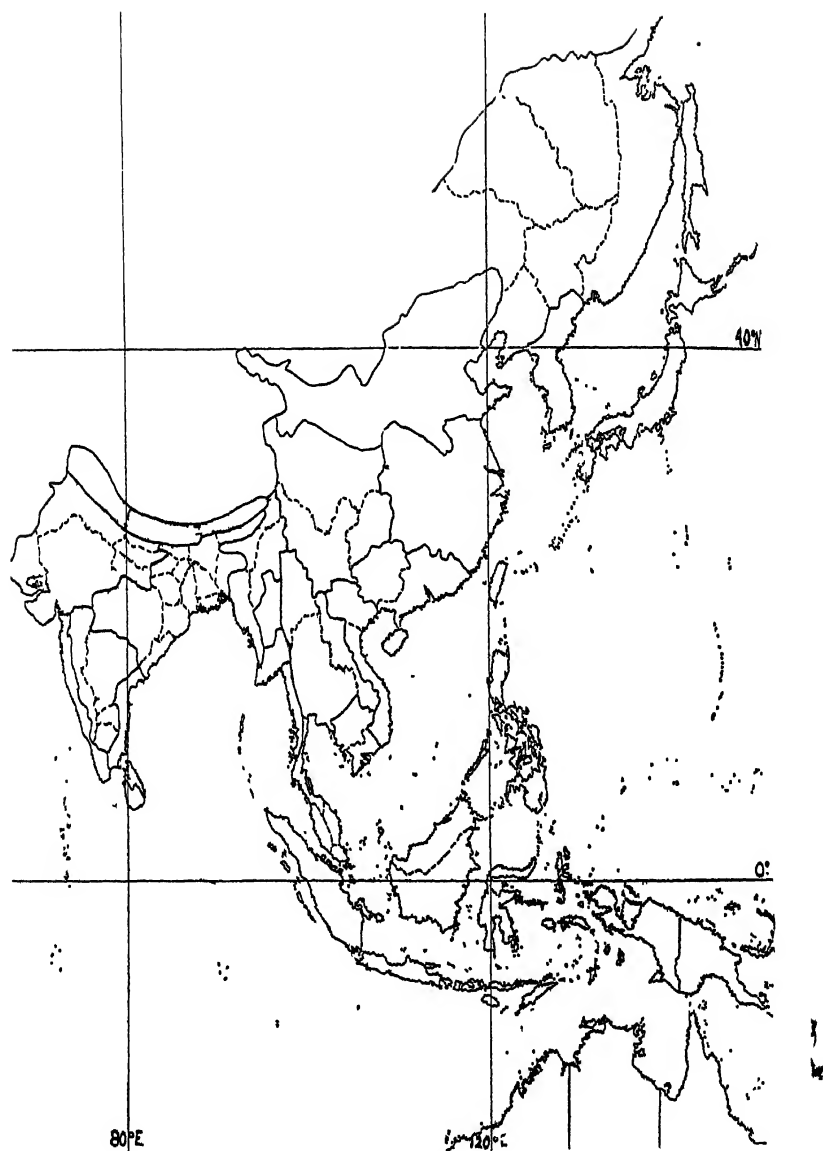
As to Madagascar, the familiarity of the Malayo-Polynesians who settled in it, with yams, is clearly demonstrated by the abundant yam-names commencing with *ovi* which are already recorded thence, and may be found in the list. That these people used and carried *D. alata* seems to have been the case, and it appears not at all improbable that they used also *D. esculenta*.

Barbaric conquests are often done by men moving forward, unaccompanied by women, destroying the men of their enemies and making captive their women; whereon a mongrel race is raised which derives its words of the chase from the conquering fathers but the words of the hearth from the captivated mothers. In this way words for weapons move whither words for foods do not, and by a comparison of the two, interesting ethnologic observations can be brought out. This list of words for food-plants may therefore serve usefully some ethnologist who will compile a contrasting list of words for weapons.

It is now necessary to plough across it in a sort of review; but a summary of results is very difficult to present clearly. One means of approaching clearness, however, seems to lie in considering first such words as are used adjectively, and after that has been done, to turn to the nouns.

These nouns sometimes indicate a particular species, sometimes a whole group of Dioscoreas, and sometimes have the meaning of "tuber" or "tuberous plant." When they indicate a group of species of Dioscorea, that is to say when they are more or less generic, in these pages they will be translated by "yam."

This word "yam" came into the English language from west Africa through the portuguese, and the readiness with which it was adopted by writers in the sixteenth and seventeenth centuries shows



MAP No. 3

Map 3. The distribution in Asia of the sections *Opsophyton* and *Lasiophyton* taken together. There are three centres in Asia of greatest development (1) in the north-western Himalaya, (2) in south-western China and (3) in Luzon. These two sections yield the most important famine foods.

that there was a need for it. The voyagers of those centuries who brought it back, had set sail with turnips, carrot-, parsnips, etc., in their stores; and at the further end had replenished their boats with diverse tubers for which they needed new names: in the main they adopted two, the one was potato, and the other was yam. Size was the feature by which they distinguished the two: and the smaller Sweet potato or batata, lent its name to the Andine potato when that later became known; while the larger Dioscoreas they gradually came to keep distinct as yams. This idea of a difference in size still holds good in our language; but in these pages it is necessary to extend the use of the word "yam" to all Dioscoreas, large or small, and even to be yet still looser; for the peoples of the East in the main have not held the idea that large and small food-tubers such as potatoes and yams should be distinguished; e.g. alu in Hindustani, ubi in Malay etc., cover both, with cassava as well. Therefore where here the word "yam" is used as the equivalent of these oriental nouns, it is to be understood that not the least contrast with the word "potato" is intended thereby.

Adjectives of size.

Very naturally *D. alata* as being the most liberal of all the Dioscoreas obtains the name of "big yam," sometimes as a species, but more commonly in a race which is conspicuously large; and so it happens that we meet with words meaning "big yam" for it (in Japan) as dai-jo, (in N.-E. India) as bara alu in Sylhet, sangia alu in Jessore, puri alu in Bogra and Darrang: (in S. India) peru valli kilangu in Tanjore, peru (mallai) kilangu in Travancore: (in Burma) myauk gyi: and (in Malaysia) ubi gede and ubi rame in Java. In all the districts, Japan excepted, whence these names have been received, *D. alata* is grown in several races, and, in general it is the largest race of those locally known which is the "big yam:" but in southern India where *D. esculenta* is familiar, and often known as the "little yam," there is perhaps an implied contrast between it and *D. alata*, not in one variety, but as a species.

In Celebes big and little *D. esculenta* may be distinguished as sayuru sela and sayuru rintek; but the noun sayuru is not quite the equivalent of "yam."

Sanskrit literature possesses in a medical work of perhaps 600 B.C. the name hastyaluka, meaning "elephant yam," and Dallana writing in the twelfth century interpreted the word "elephant" as "very large," saying that hastyaluka was a very large kastaluka. Now the word hastyaluka does not seem to have left any modern descendant; but kastaluka has, in kathalu, katharu, katharua, kathar and katharkand which like it mean "woody yam:" in the Lakhipur district of Assam kathalu appears to be a race of *D. alata* and in the districts of Mirzapur kathar and katharkand are certainly applied to this species: but katharu and

katharua in the districts of Behar and in Chota Nagpur are applied to *D. glabra*, and to *D. esculenta*: and every one of these species is as tender and edible as the others, so that the modern words do not indicate what the sanskrit hastyaluka was.

"Small yam" is the name applied to a race of *D. alata* in Sikkim in Lepcha as bokkap, or in Nepalese as sanaghar torul: and again the meaning of the Shan name manawn which is a race of *D. alata*, is "small yam." "Small yam" as already said, is *D. esculenta* in southern India, where widely it is siru kilangu or in Malabar cheru kilangu. Duri alu, with the same meaning, is used in Chota Nagpur and northwards, to denote such wild yams as *D. aculeata*, *D. glabra*, *D. belophylla*, *D. pentaphylla*, as well as *D. esculenta*. "Grudging yam" or phanrain is *D. Hamiltonii* in the Khasia hills.

Adjectives of shape.

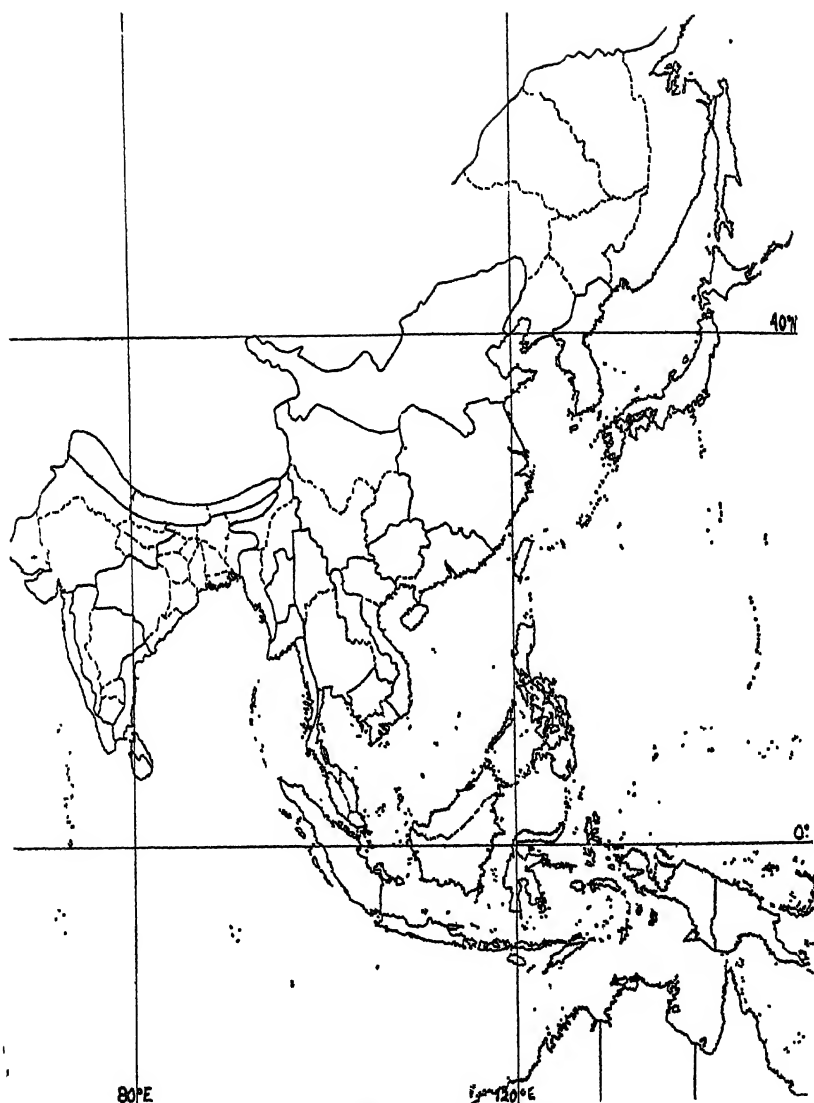
Out of the adjectives easily explained and descriptive of the shape of a tuber eighty-five in this list are found in names which are applied to *D. alata*.

There are races of *D. alata* with elongated tubers that are called by such appropriate names as the following:—"peg yam" or gojalu, "guran-pole yam" or guraniya alu, and "pillar yam" or kham alu in Bengal; "post yam" or puraia alu in Assam; "walking-stick yam" or ruichin among the Mikirs; "going-straight deep yam" or twinzouk myouk in Tenasserim; "pillar yam" or ubi rembu in the Malay Peninsula; and "pipe yam" or ubiteropong in Malay, huwiteropong in Sundanese; and "post yam" or huwitihang in Sundanese also.

The following also indicate races which have elongated tubers of characteristic form:—"spinning wheel post yam" or chakarkhuta alu in Sylhet, and "club yam" or chulijhinka alu in Orissa.

There are races of *D. alata* with short round tubers described as "basket yam" or chubri alu in Bengal, as "lime pot yam" or chungatalu in Sylhet, as "globose yam" or golratalu in the Ganges valley, as "cooking pot yam" or handia alu in Orissa, as "coconut yam" or huwiklapa in Sundanese, ubiklapa in Malay or gadongur in Achinese, as "goblet yam" or mannamtow in the Shan Hills, as "round yam" or mundia alu in Orissa and pembok in Sikkim, as "water pot yam" or myoukyeo in Burma, and as "calabash yam" or ubikalabasa in Java.

It is not unlikely that the Tanjore name of "thick yam" or muttaikavalli indicates a race of *D. alata* of somewhat similar appearance to the above. Whether the ovoid bunch of male flowers at the end of a banana inflorescence is the object of comparison in the name "banana-bunch yam" or ruilabong



MAP NO. 4

Map 4. The distribution of the poisonous sections, *Stenophora* and (P) *Paramecocarpa*. The section *Stenophora* has in Asia two centres of greatest development (1) in south-western China and (2) in Japan: it consists of plants of more temperate climates than those of the sections whose distribution is given on the preceding maps; and in part times as a consequence has been able to gain access to lands upon either side of the Pacific (via the Behring Straits bridge) and to reach the Caucasus and the Balkans, which the other sections do not.

of the Mikirs or the bananas themselves is not known to the writer. The wide-spread name "ginger yam," in Burmese *myouk gyin*, in Javanese *ubi jahe* and in Amboinese *ubi hahiya* and in Hainan *kiu-tu* would seem to be derived from the shape of the root rather than from any other attributes of the root of ginger.

A good name for a profusely branched yam is that of "antler yam" or *harinpada alu* used in Bengal.

Three Javanese names indicate tubers which have a very slight tendency to curve and are more or less pointed towards the apex, viz.—"snout yam" or *ubi hidung*, "bill of bird yam" or *ubi patok* and *ubi kepler sampi*.

"Cucumber yam" or *man yawn hta* is a name for a race of *D. alata* in the Shan Hills.

The races of *D. alata* which do not grow down into the soil, but recurve, are denoted by names such as "elephant tusk yam" or *hathidanta alu* used in the Narsingpur district of the Central Provinces of India, *hatidatia* used in the Brahmaputra valley and *khonga* used in Annam, as "lock of hair yam" or *kaisali alu* used in the Bakarganj district of Lower Bengal, as "snake yam" or *naga valli kilangu* among the Tamils of Ceylon and *ubi ular* in Malay, as "sickle yam" or *ubi arit* in Java, as "horn yam" or *man khow wo* in Shan and *ubi tanduk* in Java, and as "extruding yam" or *ubi klesik* in Java.

Flattened tubers, which likewise often have a tendency to recurve, possess the following names:—"flat-ear yam" or *bathar potia alu* in the Brahmaputra valley, "flat yam" or *chapti ratalu* in the Ganges plains, "fan yam" or *ubi badak*, *uwi badak* and *huwi badak* in various parts of Java, and *ubi kipas* in Malay, "hand yam" or *ubi tangan* in Java, "fingered yam" or *ubi sounlaun* in Amboyna, *ubi jari* in Java, and *ubi bajari* in the Moluccas, "Arto-carpus-leaf yam" or *ubi keledang* in Malay as well as *ubi daun sukun* in eastern Malaysia, "threshing board yam" or *pat alu* in Lower Bengal, "flat spreading yam" or *phan tangkara* in the Khasia Hills, and "human yam" or *ubi manusiya* in Celebes.

It appears not improbable that the "eccentric yam" or *pazien bok* of Sikkim is somewhat as the last named.

Races with more than one tuber have names such as:—"several tubers yam" or *binna jhar alu* in Bengal, "five snout yam" or *panch mukhi alu* in Orissa, "thousand snouted yam" or *sahasra mukhi alu* also in Orissa, "seven brothers yam" or *sat bhaya alu* in the Balasore district of Bengal, "twin yam" which is both *ubi kurubut* and *ubi tumpuk* in Java as well as *ait alu* in Sylhet.

It seems that the names from the Shan Hills of "small plum yam" or *man a w n k w a h* and "small egg yam" or *man leit kai* indicate a lobing of the tubers which approaches subdivision into several. The Lepchas of Sikkim have a "plum yam" or *m u j i b b o k*.

A wilder fancy gives rise to the following names:—"buffalo's-teeth yam" or *b h a i n s d e t h i k a n d a* in the Central Provinces of India, "bullock's tail yam" or *e d d u t o k a d u m p a* in the Circars, "elephant's foot-print yam" or *h a t i k u j i a a l u* in Assam, "elephant's foot yam" or *h a t i p a i a l u* in the Murshedabad district of Bengal, and *m a n t i n g s a n g* among the Shans, "bear's foot yam" or *m a n t i n m i* in the Shan Hills, "fowl's yam" or *u b i a y a m* in Malay, "deer's yam" or *u b i b a n t e n g* and *u b i m a n j a n g a n* in Java, "crocodile yam" or *u b i b o a y a* in Java, "dragon's yam" or *u b i n a g a* in Java, and "turtle's foot yam" or *m a n t i n g t o w* in the Shan Hills.

Names such as those above are useful as indications of the distribution of yams of different form in cultivation.

D. esculenta possesses one name which compares it to ginger, a comparison which was found to be made also in the case of *D. alata*. In the case of *D. esculenta* the name appears as "ginger finger yam" or *e d a t h e n g a l i a a l u* and is used in the Sib-sagar district of Assam. In this case much more clearly than in the case of *D. alata* it is made obvious that the quality in which the yam and ginger are compared is the shape. There is another Assamese name for this species derived from the same quality, e.g. that of "bitch's teats yam" or *k u k u r p o a t i* from the Darrang district. Rumph in the Herbarium Amboimense lib. 9 cap. 13 described a tuber of *D. esculenta* which suggested a suckling sow, and the small tubers round it its litter.

The commonest of all Burmese names for *D. esculenta* is "letter-d yam" or *t a h - d w e u*, and it is interpreted as derived from seeing the double curves of that letter, as written by the Burmese, in the tubers which then must be lobed. It is not an altogether satisfactory interpretation and search should be made for one more obscure and less fanciful (see p. 155 forward). The tubers are in some races lobed, otherwise it would be impossible to get the two names of *e d a t h e n g a l i a a l u* and *k u k u r p o a t i*, but most of them are not: and *t a h - d w e u* is as frequently applied by a Burman to a race with tubers that are not lobed as to one with tubers that are lobed.

D. esculenta is compared to a Shan drum in the Shan name *m a n k a w n g*: but it is not quite clear why. Nor is it clear why a race of it should be called in Amboyna *k o m b i l i c h e m p e d a h a* or "yam like (? the fruit of) *Artocarpus polyphemia*."

D. opposita receives in Japan the names of:—"stumpy yam" or *d a i k o r o i m o*, "hammer yam" or *k i n e i m o*, "long yam" or *n a g a i m o*, "lever yam" or *t e k o i m o*, and "crushed yam" or *t s u k n e i m o* in different races.

D. oppositifolia from going deep gets the names of podhali valli kilangu and jambur alla in Ceylon, while *D. belophylla* from the same character may be called in South Canara pada valli gadda.

D. bulbifera as will be seen later obtains a widely used name, genth wherein its bulbils, if the interpretation be true, are likened to small bells: it seems as if these bulbils are what obtains for it the names of "nutmeg yam" or satik kavalli in Tanjore. It is possible that they, though more probable that the root tubers, get for it in Formosa the name of "heart tuber" or simshu.

D. hispida is called the "round yam" or phansolak and "round bitter yam" or phansolak khang in the Khasia Hills. It is also the "solitary yam" or phanlyngkhi.

D. pentaphylla is compared in Bengal to the ovoid bunch of male flowers that terminates the inflorescence of a banana, and so obtains the name of mocha alu.

The dense covering of bristly roots which coats the tuber of this species combined with the usual shape suggests a pig's snout and so procures the names muka kacchel, muka keshang, pandi mukha tega, and punda mohra gudda, which are found over a wide part of the peninsula of India.

Adjectives of Thorniness.

D. esculenta is peculiar among all the oriental yams on account of its sharp thorns which are metamorphosed lateral roots on feeder roots lying near the surface of the soil above the tubers. By reason of them it is the "tiger claw yam" and "tiger paw yam," bagh thapa alu and bagh hata alu, of several of the districts, which extend north of the Ganges delta from Purneah to Maimensingh: and it is the "cock's (spur) yam" or kukul alla of Ceylon and in Java the ubi landak or "porcupine yam." Under the idea that these thorns prevent the wild pigs from uprooting the tubers, the Burmese of central Burma call it the "pig cut-off yam" or wet-ka u.

Adjectives of Season.

The season of use is indicated in such names for *D. alata* as "september yam" or binna alla in Ceylon, and for *D. spicata* as "may yam" or eedava kilangu in Travancore. Margodi gai, used by the Savaras of the Northern Circars for *D. esculenta* has been interpreted as "rains yam."

The Japanese have a quickly growing race of *D. opposita* which they call "yam that ripens in one year" or ichonen imo. The name "every year yam" or ubi tauntaun which Rumph gives for a race of *D. alata* has the same meaning. Needi kilangu meaning "long-living yam," a race of *D. alata* on the Malabar coast, would seem to mean the reverse.

Adjectives of Quality.

D. alata receives only one derogatory adjective in this list; and that is *kath* or woody which is found in the names *kath alu*, *kathar* and *kathar kand*, and they are descendants of the sanskrit *kastaluka*, the application of which is uncertain. That *D. alata* should never have worse spoken of it than this, indicates its great importance in the East.

D. esculenta, which in some races is particularly sweet to the taste has the name of "sweet yam" in *mohu alu*, *moa alu*, *mowa alu*, *mau alu*, *mausari*, or *maoli* over a very wide area in northern India: and it may be taken that these names came from the sanskrit *madhvaluka*, which we find in the Charaka Samita of about 600 B.C.; but there is no reason other than the modern application of the derivative names for stating that *madhvaluka* was *D. esculenta*. This species is the "superior yam" or *par aru* of the Unao district in the Gangetic plains.

D. Hamiltonii has the name of "excellent yam" or *bok yung* in Sikkim.

D. Arachidna is the "savoury yam" or *rui dok* of the Mikirs.

A certain range of variation in flavour in *D. alata* exists. There is for instance a race *kamodia* in the neighbourhood of Bombay with that peculiar mousy flavour appreciated in the East and found in Kamod rice—the name meaning "Kamod-like:" there are differences in the degree of starchiness or glutinosity, not seasonal; and there is a greater measure of sweetness in some races. The names found in the Ganges plains and in Java respectively, of *mithi ratalu* or "sweet ratalu" and *huwibadak manis* or "sweet fan yam" point to the sweetness; so also does *ubi manis* or "sweet yam" in Java, and *sakkaravalli kilangu* or "sugar yam" in the Tanjore district of the Madras Presidency. Burma possesses a race *myauk mwezouk* credited with fragrance: while the following names are suggestive of excellence:—

akashkanda or "heavenly yam" in the Raipur district
of the Central Provinces of India,
mahalanda or "palace yam" in the same district,
mohananda or "pleasant yam" in Berar,
rajalla or "king's yam" in Ceylon.

To them may perhaps be added:—

ubitunku or the prince's yam in Sarawak,
ubiseneur or "senhor's yam" in Java, and
rajamohandumpa or "King Mohan's yam" in the
Circars.

The "superior yam" or *phan kyrsiew* of the Khasia Hills is the cultivated *D. pentaphylla*.

1 For *ratalu* see p. 143 forward.

Palatability and nauseousness are brought into strangely sharp contrast within two species of *Dioscorea*, namely *D. pentaphylla* and *D. bulbifera*: with foliage and flowers identical, and roots not always shaped diversely, races of either species offer to him who would eat them materially in one good, in another worse than indifferent. The inevitable consequence of such conditions must be that adjectives indicating the relationship to the palate appear in the names of these races. In consequence the edible *D. bulbifera* in North Kanara is "sweet yam" or he g g e n a s u and "sweet genth"¹ or mithi genthi in the North-western Himalaya, while wild and nauseous races of that species obtain the following names which mean "bitter yam" or "bitter genth," karu k a n d a widely through the Central Provinces and Central India, karwi genthi in the North-western Himalaya, pita alu commonly in Orissa, pit k a n d a or pith k a n d a in the edge of the Central Provinces towards Orissa, and titi gethi like karwi genthi in the North-western Himalaya. This species is also the "insipid yam" or ubi blichik of the sundanese language; and its effects on the human system are expressed very strongly in the calling of it the "mad yam" or pagla alu in Chittagong and the "poison yam" (one of them) in Java, where it is huwi upas and uwi upas.

D. pentaphylla in races that are good to eat is the "sweet hairy yam" or moua jhapra alu in Assam, and the "treacle thread yam" or jageri nuren kilangu in Travancore: it is suspected that it is at the same time the "sugar yam" of shini valli kilangu among the Tamils in Ceylon. In contrast the wild and nauseous plant may be called "deadly yam" or mara keshango in Travancore. It has the name of "inferior yam" or sili bok among the Lepchas of Sikkim.

D. hispida which is always poisonous,—so poisonous that it may be used to poison a carcass left as a bait for tigers,—is the "deadly strangle cake" or marpashpoli of the Bombay Ghats. This name is sometimes reduced to "strangle cake" or pashpoli.

"Benumbing yam" or hiritalla is a name which in Ceylon is ascribed to *D. oppositifolia*, and perhaps raw its flesh may, like other species, numb the fingers—an effect not explained,—but enquiries as to its incidence should be made. "Sweet tuber" or mithi k a n d a is a name for it in the Saugor district of the Central Provinces; and it is much sought as food both there and in all the neighbouring parts of the country.

"Bitter yam" or pitharu is ascribed to *D. aculeata*² in Chota Nagpur. Kasa alu, with the same meaning, is also ascribed to it in the districts of Angul and Balasore. It is a muddled

¹ For genth see p. 144 forward.

² The name *D. aculeata* is here used for the species called *D. Wallichii* in the Flora of British India. The reasons for the change are to be found in the Kew Bulletin, 1919, p. 352.

name and may be muddled in its application. The name of "yam like a Colocasia (in taste)" or *kochadia alu* is another name for the species received from the district of Angul.

Adjectives of Colour and Texture.

Tubers of *D. alata* may possess a crimson colouring matter or may be without it. The colour of those without it causes the following names to be given:—

- "white yam" or *safed ratalu* in the Ganges plains,
dhaula alu in northern Chota Nagpur,
myouk u pyu in Burma,
ubi puteh in Malaysia,
- "milk yam" or *dudha alu* in Chota Nagpur,
merom tuar sanga among the Kols of
 Chota Nagpur,
kiri vel alla in Ceylon, and
ubi susuq in Java,
- "lime yam" or *ubikapor* in Java,
- "rice (like) yam" or *ubinasi* in the Malay Peninsula,
samoan nasi in Bali,
- "fish yam" or *mach alu*, *machua alu*, and *mas alu* in
 various parts of Bengal,
mach ranga alu (fish-colour yam) in
 Bengal,
halgugia alu (Hal-fish yam) in Assam,
myouk nga cheik (sticky fish yam) in
 Burma,
- "bright yam" or *ujla ratalu* in the Ganges plains,
ujla machalu in the Santal Pergunnahs
 of Bengal,
- "salt (coloured) yam" or *phanmluh* in the Khasia Hills.

Upon the other hand the races with the crimson colouring matter in them possess the following names:—

- "red yam" or *rato torul* in Nepal,
rakta alu in Bengal,
raht ala in Chittagong,
sanglal in Chota Nagpur,
myouk ni in Burma,
man leng in the Shan Hills,
ubi merah in the Malay Peninsula,
kombili merah in Java,
ubi abang in Java,
ubi gendola in Bali,
ubilaha in Celebes,
- "henna yam" or *alta alu* in Bengal,
- "henna-leaf yam" or *altapatti alu* in Bengal,
- "yam as (seed of) *Melastoma malabathricum*" or *ubi ken-*
duduk in the Malay Peninsula.

To these the sanskrit *raktaluka* should be added, for without doubt over two thousand years ago it indicated a crimson-fleshed *D. alata*; its modern descendents have lost the exact point of the name. Also a Javanese name *ubi bulong* or "blue yam" may refer to a crimson-fleshed race, but it is more probable that the author, who has recorded the use of the adjective *bulong*-meant *butung* (see p. 159).

The cultivated *D. pentaphylla* has in Bengal a name *ganga-jali alu* which means "Ganges-water yam," possibly because it boils to the grey colour of the river Ganges.

Among the names for *D. alata*, above, have been given several which compare it to fish, and they have been said to be used for white-fleshed races of *D. alata*, but it is to be recognised that the glutinosity of the boiled yam equally suggests the flesh of fish. This glutinosity gives rise to the following further names:—

"glutinous yam" or *myouk kaukhyin chiek* in Burma,
ubilikat in Sundanese,
huwiputun in Sundanese (perhaps).

"wax yam" or *mom alu* in the Central Provinces of India,
ubililin in Sundanese,
huwililin and *uwililin* in Javanese,

"cold yam" or *man kat* in the Shan Hills,
 "frog yam" or *myouk hpa cing* in Burma.

The flesh of *D. alata* is never really yellow, but at the most is of the white of ivory: but one dutch writer has stated *huwibadak kuning* or "yellow fan yam" to be a javanese name for a race of this species. The writer is inclined to consider it as an error.

Yellow flesh is however characteristic of some of the species of the section *Lasiophyton*, and we get for *D. hispida*, in Java, *gadong kuning* or "yellow gadong" and for *D. pentaphylla* in Assam *ed alu* or "ginger yam" in which the colour of the root of ginger seems to be the quality referred to; and we get in Sundanese *huwijahe* or "ginger yam" also, which becomes *samoan jahe* in Bali.

D. assamica possesses a name among the Mikirs ruiring which is translated as "bluish yam."

Not to the colour of the flesh, but to the hard skin of the tuber of *D. bulbifera* are due the names for it which mean "black yam" e.g. *kala kand* in the Central Provinces of India, and *kal genasu* in Malabar.

But this same species in cultivation gets names which call it "white yam" in *ubi puteh* in Java, *huelya puteh* in the island of Saparua, Moluccas, and *elan puteh* in the island of Ceram.

Fibres running through the flesh cause names which mean "thready yam" to be applied to *D. aculeata* such as nare tegalu and nare tega in the Circars, nare genasu in Malabar and narigaddi in Travancore. Again such names are applied to *D. tomentosa* in nulu tega, nulu dumpa, nulu goddalu and nulvalli kilangu in various parts of the Madras Presidency, and in sutalu which is used in Orissa.

Thirdly *D. pentaphylla* gets corresponding names which it shares with others, sutalu in Orissa, nuran kilangu in Travancore and huwisawat in Sundanese.

Nuli kilangu or "fibrous tuber" has been received attached to a specimen of *D. oppositifolia*, but it is not an applicable name, and seems to have been attached in error.

Suna genasu or "lime yam" is an unidentified *Dioscorea* of Kanara. Chun alu which name also means "lime yam" is *D. Hamiltonii* in the Mayurbhanj State of Orissa. Bhat alu or "boiled rice yam" is *D. glabra* in northern Bengal and in the Brahmaputra valley, and is a not-inapplicable name. But why *D. pentaphylla* should possess the names of dhan alu or "grain yam" in the district of Birbhum, western Bengal, and samoan nasi or "cooked rice yam" in the island of Bali is not clear.

D. anguina is called haldia alu or "turmeric yam" in Assam, doubtless from the presence of orange-colour in the older parts of the tuber.

Deprecatory names.

It is a common thing in language to assign inferior plants to familiar animals, as our dog-rose, horse-chestnut, pig-nut, sheeps-parsley: and *Dioscorea* in the East offers illustrations. Sometimes the assignment as in the case of dog-rose is purely figurative; and sometimes as in the word pig-nut there is appropriateness in it. We shall find *Dioscorea* assigned in both degrees. It is in its inferior species most commonly assigned to the wild pig, and not without reason for the wild pigs very largely feed upon the wild yams.

Nauseous *D. pentaphylla*, *D. bulbifera*, and the poisonous *D. hispida* are so assigned in the following names:—bara kanda, barai kand, barahi kand, bada kand which are used in Western Hindi and from the borders of this language into the Central Provinces of India here and there for all three. But baro gai in Savara and burdigaddi in Telegu are applied to *D. tomentosa*. The names dukur kand, dukur kand and dukel kand also mean "pig's yam" and are used in the Central Province of India to the south of bara kand: they are applied to wild *D. pentaphylla*. Dukka pendalam that is "pig's pendalam"—(*D. alata* is the usual

meaning of pendalam) is a name for *D. pentaphylla* received from the Vizagapatam district of the Circars. The name *pedra kanda* for nauseous *D. pentaphylla* in the Damoh district of the Central Provinces seems to mean likewise "pig's yam." In Java the name *chanar babi* or "pig's Smilax" is applied to *D. polyclades*, *D. deflexa*, and perhaps to other species.

Once or twice *D. belophylla* has in the writer's experience been pointed out in the peninsula of India as "pig's yam" under one or another of the above names; but by misapplication.

Interesting names are such as *sur alu*, *suar alu*, *suaria alu*, and *suareh alu* which are applied to *D. bulbifera* widely in Bengal, *sura alu* and *suri alu* which are used in Eastern Hindi for *D. pentaphylla*, *surka* and *sumri* for the same in the Jhansi district, *surendikand* in the Bilaspur district, and *supnor kand* in the Raipur district. The men who use the words in most cases connect them with the hindi word for a "pig" and would translate them as "pig's yam" like the several already mentioned; but there is a sanskrit verb "sur" to hurt, and in it probably the real origin lies; their name once having been "hurtful yam" and not as now "pig's yam."

D. bulbifera is the "dog's yam" or *kukur torul* of Nepal, and *kukur alu* of Lower Bengal; nauseous *D. pentaphylla* is also the "dog's yam" or *kukur alu* of Lower Bengal; and *D. sikkimensis* is another "dog's yam" or *kukur torul* of Nepal.

Monkeys have yams assigned to them in the names *bandri alu* or *bandoreh alu*, used for nauseous *D. pentaphylla* in the Ganges plains, from the districts of Monghyr and Bhaghalpur for some distance westward, and also in the name *akar mawas*, which means the orang-utan's creeper, and is applied to *D. purifolia* in Malacca.

To the jackal, *kolo kand* may be considered as assigned: but there is some reason for thinking that an older word may be in the name. *Kolo kand*, *kulu kand*, *kulu sangha*, *kolki*, *kulia*, *kulika*, and *kolhua* are forms of this applied to *D. hispida* in Orissa, Chota Nagpur and westward to the Melghat.

To the tiger is assigned that same species in the names *bagh alu* or *baghra alu* which are used in Orissa. In *bagh torul*, a name used in Nepal and Sikkim, it is *D. glabra* which is the "tiger's yam."

To the elephant is assigned *D. bulbifera* and *D. pentaphylla* in the name *hathia kand* used in the Shahabad district, Bengal. The name *hastyaluka* has been mentioned already with the suggestion that "elephant yam" in that case means "very big yam"; but again it may not have meant this.

The ant is connected with *D. purifolia* in the name *chanar semut* of "ant's Smilax" used in western Java.

C'hamaralu or "flesher's yam" is a brahminical name for nauseous *D. pentaphylla* received from the neighbourhood of Calcutta.

Names from the fragrance of the flowers.

The fragrance of the flowers has caught the pleasing malay fancy so that a series of names exists connected with it, such as akar bunga keminiyan or "benzoin-flower creeper" which is curtailed into akar keminiyan, akar kamiyan, akarkamoyan, akarkamayan, akarkumoyan, akarkamahang and apparently akarmajuan and akarmumujan,—all meant for "benzoin creeper." Or a word for yam may be substituted for the word for creeper, so that we get huwi kawaiyung and huwi kawoyang, ubi kawayong and uwikawayong which are likewise to be translated as "benzoin yam." These names are used in the Malay Peninsula, the Menangkabau region of Sumatra and in Java, and denote such wild Dioscoreas as *D. pyrifolia*, *D. laurifolia*, *D. filiformis*, and probably others, indeed perhaps all wild species of the section Enantiophyllum.

The scent of the flowers of *D. hispida* earns for it the name of gadong kasturi or "musk gadong" in Bali and ondot kasturi in C'eram, and also of gadong malati or "jasmine gadong" in Bali.

Babra kand or "acacia yam" for *D. bulbifera* in the Chanda district of the Central Provinces of India would seem also to be earned by the scent of the male flowers, unless it is a corruption of bara kand or hog's yam.

Confusion with Smilax.

The similarity of Dioscoreas and species of Smilax leads in the Malay Peninsula and Java to the use of such names as akar kelona, ubi kelona, aroi chanur and chanar for various wild Dioscoreas. Kelona or klana in the Malay Peninsula usually means a *Smilax*, just as chanar does in Java. The Japanese also compare it with *Smilax* (see p. 140 forward).

Names suggesting transportation.

Yam-names only in a very small measure suggest transport. There is a race of *D. alata* which in the Malay Peninsula has the name of "java yam" or ubi jawa as if it had been carried that small distance. There is another in Java known as the "indian merchant's yam" or ubi kuja, kuja or kwaja being the master of an indian trading ship, suggesting in its name that it reached the Malay region from India.

The origin of the edible *D. pentaphylla* is not indicated by any oriental names, but there are two names which suggest its introduction into the places where they are used: one of them is given by Rumpf and is that of "Priaman yam" or ubi pariaman said by him to be used in Ternate, Priaman being

in Sumatra: the other is "Menado yam" or ubi mangindano used in north Celebes, the Menado region being in the north of that island. This same yam has been called to the writer "foreign yam" or belat myouk-u in Lower Burma by a man using the corrupt hindustani word belat for foreign in association with the Burmese term for *D. alata*.

The cultivated *D. bulbifera* is known in India among europeans as the Otaheiti potato. It is sometimes called "spanish yam" or ubi kastela in the Malay Peninsula and "chinese yam" or ubi china in the Dutch Indies.

Religious use.

In the Gangetic plains in certain parts, to eat *D. esculenta* on fast days is permitted; and throughout the northern part of the Central Provinces it is likewise lawful on these occasions to eat a meal called bechandi made from certain wild yams. A religious meaning has not been demonstrated in the names applied in India; but in Java, in regard to edible *D. pentaphylla* and to one species of the Section *Enantiophyllum* vernacular names suggest a religious use. These names are huwidedewata, katak dewot, and huwimantri meaning "sacred yam" and "priest's yam." Now the words, which in these names qualify the word for yam, are of sanskrit origin, and the first of these yams, also in the same part of Java, is called huwi paturi or "princess' yam", the word paturi or putri being sanskrit. Like the several sanskrit court words and words for the trappings of elephants in the Malay language these yam names must have come into existence, where they persist, from the old Indian kingdoms which in Java left the hindu religion and the magnificent temple of Borobodoer; and it would be in connection with observances of such a court that they were applied. The obvious suggestion is that these Dioscoreas were once used in Java as *D. hispida* is upon the west side of Bengal and *D. esculenta* in the Gangetic plains, to supply a food permitted on fast days. Now hinduism found a refuge, from persecution in Java by flight to Bali and it would be most interesting to have enquiry made there among the descendants of immigrants from Java as to the use if any, that they make of *D. pentaphylla* and other Dioscoreas, and the names that they apply to them.

The nouns for yams.

Nouns used as names for yams possess a vastly greater interest than the adjectives coupled with them; but they are more difficult to deal with, as being often the flotsam of a lost language. The reader in consideration of them should keep in mind that these food yams may be held as of six groups:—

1. the cultivated yams of the section *Enantiophyllum*, i.e. *D. alata* and *D. opposita*,
2. the cultivated yam of the section *Combilium*, i.e. *D. esculenta*,

3. other cultivated yams, being in Asia derived from *D. bulbifera* and *D. pentaphylla*,
4. the wild edible yams of the section *Enantiophyllum*,
5. the uncultivated species of the sections *Opsophyton* and *Lasiophyton* together, without *D. hispida*,
6. *D. hispida* alone.

The areas that the first three of these six groups occupy are indicated on the map on p. 166. The distribution of *Enantiophyllum* is on map 1: and of *Opsophyton* with *Lasiophyton* on map 3.

Races of *D. alata* distinguished by nouns.

The natives of the Konkan coast of India go so far in distinguishing yams as to call even the varieties of *D. alata* by words used as nouns, e.g. bhusara, chaina or chini, denni, kamodia, kon, pandra, talbada, tamra, etc. They do in fact what an English gardener does when he speaks of a Gloire de Dijon or a Marechal Niel, and expects to be understood without using the word rose after each name. Not so the peoples of other parts of India proper, nor of any peoples upon the west side of the Philippines, where again we meet with this manner of speaking. Then again we get it in New Guinea, New Caledonia and in Fiji. It indicates a great familiarity with yams as food.

Whereas in the names used upon the Konkan coast a meaning can be read, Mr. C. Harold Wright says of the names used in Fiji that he has "been quite unable to find out from Fijians any meaning in most." Those islanders, he adds, would find it pedantic if the word *umi* for yam should be placed in speaking before the words *damuni*, *taniela*, *korengu*, etc., by which they indicate the races. A people that so subdivides *D. alata* is likely to distinguish very clearly the widely different species such as *D. pentaphylla*, *D. bulbifera* or *D. hispida*, as this illustrates. A very emphatic abusive name for *D. hispida* occurs, as already mentioned, among the upper strata of the population towards Bombay, namely *mar pash poli* or "deadly strangle cake"; and from Bombay for quite a considerable way southwards *shendwel* and its variants indicate *D. pentaphylla*, while *karanda* and its variants indicate *D. bulbifera*. In the Philippine islands apart from Malay words, either in the Tagalog or the Visayan language, such names as *ballolong*, *bininag*, *dinogo*, *tamis*, *tubayan* or *tumitok* denote races of *D. alata*.

The following are all Fijian names for races of *D. alata*:—*dakulavu*, *davunikoka*, *damuni*, *dikama*, *ga*, *gone*, *kasokaso*, *kaumaile*, *korengu*, *koto*, *kuku*, *kurukuru*, *lokaloka*, *matawai*, *mbati*, *mboroniliga*, *mbotia*, *mbuti*, *naisavu*, *nise*, *rausikula*, *rausivula*, *rausi*, *sabalavu*, *sosi*, *tambulatawa*, *taniela*, *tikausivaro*, *togoniwakaya*, *veiwa*, *voli*, and *yarisi*.

They are enumerated here to show how they are scattered through the alphabet, as would be expected of borrowed and probably distorted nouns and adjectival words become nouns.

In Fiji *D. pentaphylla* is known as *k a i l e* and *D. bulbifera* as *b u l o*.

On pp. 173-177 below, three lists are given: one is of instances wherein *D. hispida* is admitted as of the genus of *D. alata*; the second is of instances wherein *D. pentaphylla* is admitted, and the third is of instances wherein *D. bulbifera* is admitted. The generic word found to be most common in these is *k a n d* or *k a n d a*. It is a sanskritic word. It stands nine times for *D. hispida*, twelve times for *D. pentaphylla* and twenty-four times for *D. bulbifera*. Now there are 67 names in all in the list wherein *k a n d* or *k a n d a* occur, and 61 per cent of them go to these three species; and of names not in the list because they are not applied to Dioscoreas several with *k a n d* in them can be quoted, e.g. *Pueraria tuberosa* yields a *k a n d* and so does *Nelumbium speciosum*, *Zehneria umbellata*, and the Sweet potato also. It is evident that *k a n d* much more approximates to "tuber" than to "yam" and is so translated below.

Second to *k a n d*, and also sanskritic, comes *a l u*, which occurs once under *D. hispida*, nine times under *D. pentaphylla*, and sixteen time under *D. bulbifera*. Its derivatives, *m a t a r u* which occurs twice under *D. hispida* and once under *D. bulbifera*, *g e d d a l u* which occurs once under *D. hispida*, and *p e n d a l a m*, which occurs once under *D. pentaphylla* and twice under *D. bulbifera*, make up the total thirty-three, which is only 16 per cent of all the names containing a *l u*.

Third comes *u b i*, with *u v i*, *u w i*, etc. It stands applied to *D. hispida* twelve times, to *D. pentaphylla* eight times and to *D. bulbifera* nine times, making a total of twenty-nine, and giving a percentage of 15.

A l u and *u b i* are good instances of what it seems reasonable to translate into English by the word "yam."

Nouns in a Geographic Sequence more or less by sub-regions in the Plant-world.

The nouns will now be taken in an arrangement which is suggested by the distribution of the plants to which they apply, commencing from the north-east of Asia.

Japanese Names.

In Japan, *D. opposita* is cultivated, and before the introduction of the potato, was second to *Colocasia antiquorum* in importance among starchy tubers. Both these esculents the Japanese place under the noun *i m o*; and they logically extend the use of *i m o* to the wild Enantiophyllous *D. japonica*, as well as to the potato,

artichoke and sweet potato. On the other hand they designate the Dioscoreas of the section *Stenophora* as logically by the noun *tokoro* or *dokoro* but extend the use of the word to plants which do not come within the genus. *D. hispida* and *D. pentaphylla* do not occur in Japan: but *D. bulbifera* does, and has got itself classed both as an *imo* in the names *kashiu imo*, *benkei imo* and *nari imo*, and as a *dokoro* in the name *maru dokoro* or *maruba dokoro*, obviously on account of its intermediate characters. Were there no other names, it would be possible to argue from this uncertainty a modern introduction; but it is called by the curious and probably old nouns *zembu* and *seppu*, which possibly have interesting origins. No influence from without appears obvious in them nor in any of the above names; but in literary Japanese the name *kai* is used, and is of the interesting group of words of the K-group collected together on the map No. 8 facing p. 156.

Kashiu in Japanese stands for *Smilax*, and *kashiu imo* may be translated "Smilax yam."

Daijo and *jinenjo* are contrasting words for a cultivated (big) and for a wild edible yam, namely one said to be *D. alata* and the other *D. japonica*.

Names of Liu-kiu islands.

In these islands the K-group of nouns, which has just been commented on as present in Japan in *kai*, occurs in *ku* - which is the commencing syllable of *kugwa* [*imo*] for *D. esculenta*, and *kuru* for *D. rhipogonoides*.

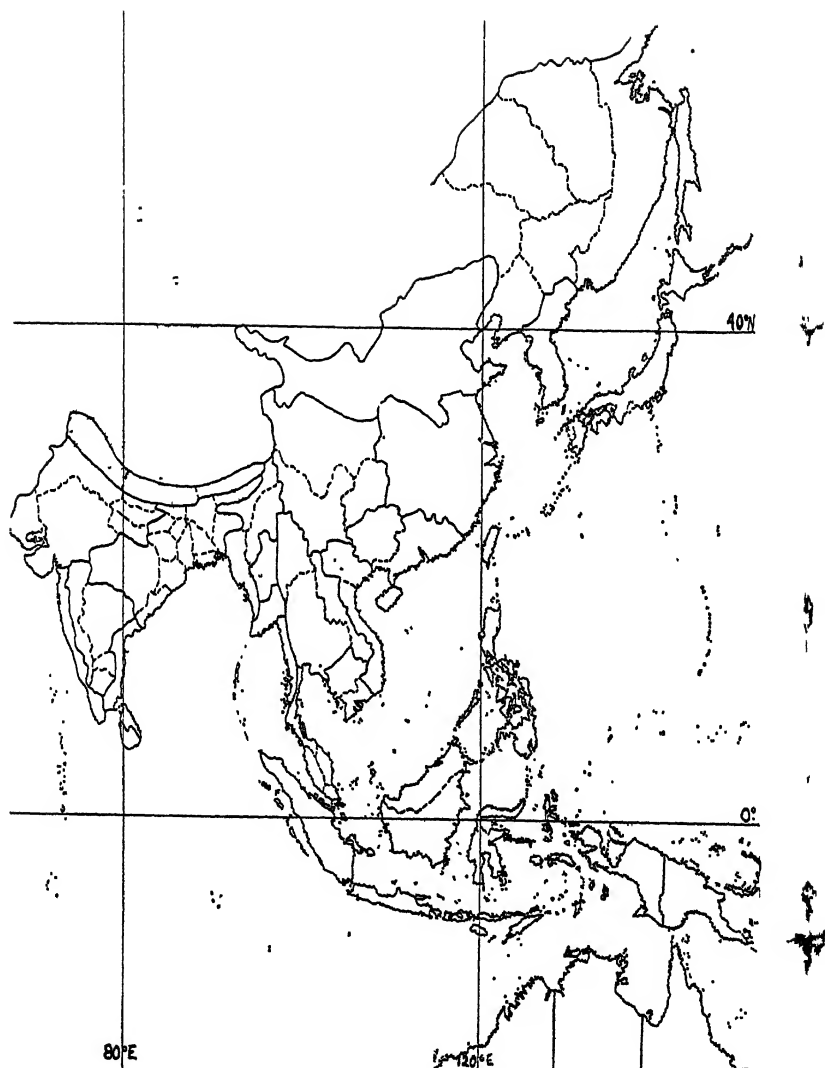
Indigenous names of Manchuria, Corea and Formosa unknown.

From Formosa we have only Chinese names, and from Corea none.

One species of the section *Stenophora* is common in the Amur sub-region and Manchuria, but what it is called is unrecorded. Enantiophyllous yams do not go so far north upon the mainland of Asia.

Chinese names.

In China the words *uh* and *yu* appear to be the equal of the Japanese *imo*: they indicate *Colocasia antiquorum* in the first place, and after that *D. alata* or *D. opposita* according to climate. As *shan yu* and *shan uh* or "hill yam," they indicate species of Enantiophyllous yams occurring wild, which also, because they are used medicinally, may be called *shan yao*. The word *shu* which is "tuber" rather than "yam," is used for the tinctorial *D. rhipogonoides* as well as for edible Dioscoreas; so also the word *tsu* means tuber. For Dioscoreas of the section *Stenophora* the Chinese, as far as records go, have no collective name. *D. bulbifera*



MAP No. 5.

according to one authority is *ma o y u t s e* or "hairy Colocasia," and *D. kumoonensis*,—a species a little better upon the whole for eating, is *ma o s h u t i n* or "hairy tuber creeper." *D. hispida* is almost absent from China, and no name for it is to be expected.

Kai is used in Kwangtung as in Japan: and *ka-lau* recorded as for *D. bulbifera* in the Honam islands of that province carries that noun.

Possibly a special interest is buried in *huai shan yu*, a medicine which has a big use in China and is made from tubers of one or more Enantiophyllous Dioscoreas. This medicine, when it reaches Tonkin, is called *kh o a i s h a n y u*; and it looks about as probable that the word *kai* (= *kh o a i*) is in the Chinese name, as that the Chinese so designate the drug from the mart of Huai-shien, which is only one of very many places where the drug is dealt with. The name accordingly has been entered on to the map of the K-group of yam-names.

Caucasus and Balkans.

Dioscoreas in the section *Stenophora* extend to the Caucasus and to the Balkans, but there is nothing to record regarding them.

Names in the Western Himalaya beginning with TA, etc.

From as far west in the Himalaya as Enantiophyllous Dioscoreas go, eastward to Sikkim, a word for yam is one of a series commencing with T., e.g. *tarri*, *tarar*, *tarari*, *tarur* and *torul*. Onto the plains under the North-west and Central Himalaya, this T-group in no clear way spreads: but it is otherwise under the Eastern Himalaya, where *tha* is the Bodo word of old Assam for yam: and as such it commences the names of all readily edible Dioscoreas among the Garos. East of the Garos on the other side of the Khasias in the Cachari language *tha-*, and more commonly *ta-*, are used, as in *thanairang*, *tamisi*, *tarem* and *tashep*. *Thaireng* (sometimes *dairang*) is a race of *D. alata*. *Thaguna* is the sweet Potato. *Tamalo* as a name for *D. bulbifera* has been received from the Katha district of upper Burma. It is possible further that the Burmese names *thadut*, *thindouk*, *thin-on* and *thin-gyat* may carry it and that again the *thi-* of some of the Tonkin names is the same. To them a place will be given later: here under "Himalaya" they are mentioned to indicate the extent of the T-group of names, (see the map No. 5 opposite). *D. bulbifera* is not as a rule a *tarri* or *torul* in the North-west Himalaya, nor is *D. pentaphylla*: but the latter has a well known name beginning with T,—*tegun*—a used all along the Himalaya from Almora and Naini Tal to the Nepal hills over Champaran; and under the hills in the Eastern Hindi and Behari languages this is turned to *te na*, *te on a*, or *te on i*. It is not clear that it contains the pahari word for yam, but it is applied like *torul* to useful plants, for it designates edible and not nauseous *D. pentaphylla*.

The nauseous and poisonous yams in the Himalaya.

Westward of where *teguna* is used, *D. pentaphylla* has the names of *debbar*, *dhaiva* or *draigarh*: whether this is applied to nauseous *D. pentaphylla* alone, or to edible as well, has not been established: and it must suffice to call attention to the name. In some part of the Himalaya, *D. bulbifera* appears to have the name *khitta*, and the poisonous *D. deltoidea* has a very well known series of names,—*krits*, *kris*, *krish*, *krithi*, *kins*, *kithi*, or *kildri*. It is exceedingly probable (a) that *khitta* has a common origin with *krits*: (b) that *khitta* would not be applied by a discerning person to cultivated *D. bulbifera*; and (c) it is evident that they have nothing in common with the T-group of names.

There is an infiltration into the hills of sanskritic words, so that *alu* is known, and for *D. bulbifera* words of the *genth*-series are used locally. It is to be asked if the words used for *D. pentaphylla* in the Himalaya of Almora and Naini Tal, e.g. *ghajir* and *ghanjir*, are in origin hill-words, and if the name *ghandiali*, recorded for *D. belophylla* as well for *D. alata* in the Kangra district, is also. The last particularly suggests *genth*.

Quite distinct is the well established name—*mangaya*, *magiya*, *muniya* for *D. kamoonensis*: and so is the Paharia *begur* for edible *D. pentaphylla*.

Atkinson recorded the name *gun* for *D. deltoidea*: it stands at present unsupported. Equally unsupported is another name for it,—*shingli*.

Perhaps it is well to summarise these names, and it may be done thus:—

edible and pleasant yams	.. nouns of the T-group
edible <i>D. pentaphylla</i>	.. { <i>teguna</i> which is perhaps a noun of the same group, <i>begur</i>
edible <i>D. kamoonensis</i>	.. nouns like <i>mungaya</i>
nauseous <i>D. pentaphylla</i> and <i>D. bulbifera</i>	.. { <i>debbar</i> , <i>draigar</i> , <i>dhaiva</i> , <i>ghajir</i> , <i>ghanjir</i> , <i>khitta</i>
poisonous <i>D. deltoidea</i>	.. <i>krits</i> , etc., <i>gun</i> , <i>shingli</i> .

The names in the Eastern Himalaya.

The Lepchas of Sikkim use *bok* for *torul*: they call *D. bulbifera* *kaching*: *D. melanophyma* is *tuk jhok* and *D. hispida* *ruglu* or *roflu*. An edible variety of *D. pentaphylla*, which is not uncommon in their hills they admit as a *bok* under the name of *suli bok* or “inferior yam,” calling the species also *kussok*. There is nothing in common between these and the words of the North-west Himalaya beyond the degree in which species of different utility are named apart.

Little is recorded from the Himalaya east of the Lepchas, beyond the name *tow o* which is said to be bhutanese for *D. pentaphylla*, and may be part of the T-group mentioned above; *nachaykyu* said to be bhutanese for *D. belophylla*; and *jing-jing* or *je-n-gin* said to be an Abor word for a *Dioscorea*.

Names in North-western India and Sanskritic names.

The proper word for yam through north-western India is *alu*; and it was written *aluka* in sanskrit. The Aryans brought its ancestry into India, and in apparently the last two thousand years it has developed in a rather interesting way. To those who wrote sanskrit there were several kinds of yams under *aluka*: we find them recorded for instance in the Susruta Samhita in a place where diet is discussed.

The Susruta Samhita is a sanskrit work on medicine of about 600 B.C.; supposed to have originated in Benares. It makes mention of *hastyaluka*, *kastaluka*, *madhvaluka*, *pindaluka*, *raktaluka* and *sankaluka*. Of these six names, four are represented in current language: e.g. by *kathalu* or *katharu*, *matalu*, *mataru* or *matharu*, *maualu*, *mohalu*, *moaalu*, *mowalu*, *maoli* etc., *pendalu*, *pendia*, *pindhi*, and *pendalam*, and *ratalu*: and from the application of these modern names to *D. alata* and to *D. esculenta*, it might be assumed that when the Susruta Samhita was written, *aluka* indicated the cultivated *Dioscoreas*: but unfortunately for such an assumption, there exist the names in Chota Nagpur of *pitharu*, *katharu* and *phararu* applied to wild though edible yams: and *aru* being akin to *aluka*, it is left possible that *aluka* had a wider significance than the cultivated yams.

Before passing on attention may be directed to the word *pangaru* used also in Chota Nagpur; for it is evidently sanskritic meaning "delicate yam" and is applied to a race of the cultivated *D. alata*, a good contrasting word to *katharu* or "woody yam." Of these names from the Susruta Samhita *pindaluka* or something similar, reaching the Circars, gave rise to *pendalam*,—a word no longer of the narrow meaning which it must have had originally, but used for all races of *D. alata*, and the same or something similar reaching Berar, seems there to have given rise to *pendia* or *pindhi* which is applied to *D. esculenta*.

It is an interesting and obvious circumstance that *raktaluka* as used by those who wrote sanskrit and *ratalu* as used by the enormous number of those who eat it to-day, are not synonymous: in the two and a half millenia which have intervened it has ceased to indicate a red-fleshed *D. alata*, and has come to indicate any *D. alata*, so that the tautology becomes necessary and exists of *lal ratalu*. Similarly other names may have changed and the application of *pendalam* to *D. alata*, while *pendia* is

D. esculenta, suggests a similar happening. To which of the two did pindaluka apply? Dallana, the commentator on the Susruta Samhita of the twelfth century, wrote that pindaluka was a downy plant, and it appears therefore that *D. esculenta* was meant by him: there is also another reason why this should be the case. The word pind carries a religious meaning;—pindushp is the Asoka tree: pind-tailak is olibanum, pindges is myrrh and to this day *D. esculenta* is a permitted food on fast days in parts of the United Provinces of upper India. Pindaluka, therefore appears to be the sanskrit for *D. esculenta*; and if so, then the inhabitants of the Circars who possibly did not receive the word until the time of Asoka, misapplied it, and so got pendalam.

Pursuing these names further, if pindaluka stood for *D. esculenta*, did madhvaluka do so also? Possibly: for there are sweet and scarcely sweet races of it. But, mataru an obvious offspring of madhvaluka, equally with moaalu, is *D. alata* just as, very widely in Bengal, mithali is: and it is necessary to keep an open mind.

There is current in northern India for *D. bulbifera*, a very considerable series of names connected with the word "gendi", of sanskrit origin and meaning a "little ball." Without doubt these names originated in the resemblance of the bulbils, as already mentioned, to small balls. The series begins with genth which is used in the foot-hills of the Himalaya where it is quite well-known and with geta in Behari. The absence of *D. bulbifera* in the centre of the Gangetic plain causes it not to appear there; but it spreads upon the south of the plains where *D. bulbifera* occurs; and from Lolitpur eastwards to the Sontal country it is well-known though it gradually departs from its proper form into curious modifications: it also penetrates through the wilds and wastes which fence the Deccan on the north into the Central Provinces administration, in doing so rather losing itself. The forms that it takes are:—genth, genthi, gethi, angethi, agitha, ghita. ghita torul, gathalu, ghenti, gita, gathour kand, gitora kanda, girchikand (misapplied to *D. anguina*), anathikanda, and probably gharialu. Although we appear to have no direct evidence that those who wrote sanskrit used a word of this series; it is clearly extremely probable or more than probable that they did; and what is of interest is that *D. bulbifera* was excluded from the genus aluka. Before passing on the geographic extremes of the use of names of this series may be set down:—they are the districts of:—

gethi, Almora and Naini Tal, Mirzapur, Monghyr, Sontal pergunnahs, Hazaribagh, Ranchi, Palamau; also apparently Nepal.

genth, Gorakhpur.

genthi Champaran, Palamau.

ghente, Manbhum.

g h e n t h i, Mirzapur.
 g a u t h i, Hazaribagh.
 g o n t h i, Hazaribagh.
 g e t c, Champaran.
 g h i t a, Nepal.
 g i t a, Darjeeling, and general in the Behari language
 g i t h a, Champaran.
 g e t h i, Gorakhpur, Baghelkand.
 g e t h r i, Hazaribagh,
 g h a r i, Saugor.
 g i t o r a, Bilaspur.
 g i t h o r a, Mandla.
 g i r c h a, Jabalpur and Raipur.
 g a t h, Saugor.
 g a t h a l u, Nimar, Amraoti
 g a t a l u, Amraoti.
 g a t h o u r, Narsingpur state.
 a n g e t h i, Etah, Monghyr.
 a n g i t h a, Baghelkand.
 a g i t h a, Jhansi, Bandelkhand, Narsingpur, Balaghat, Mandla
 and Jabalpur.
 a g e t h a, Balaghat
 a n a t h i, Monghyr, Hazaribagh.

For nauseous *D. pentaphylla* there exist the names which as suggested on p. 135, may be connected with the sanskrit verb "sur—to hurt". These are surka used in the Jhansi district, sumri used in the Jabalpur district, supnor kanda used in the Raipur district, sur kanda in the same district. surendi kand in the Bilaspur district, and without doubt suri alu or sura alu extending through Western and Eastern Hindia from the borders of Bombay to the borders of Bengal, and sur alu, suar alu, suaria alu and suareh alu in Bengal. Superficially these names appear to be connected with the words for "pig": but the connection in the mind with the pig is doubtless secondary; and it is probably responsible for the adding of alu or kand to the first part of the name if so, then those who wrote sanskrit should not be thought of as admitting *D. pentaphylla* to be an aluka.

For edible *D. pentaphylla*, extending from the district of Palamau, through those of Gaya, Monghyr, and Shahabad into Baghelkand, there exists the name kha ne ya, kha newa or kha nia kand. Such a name has been received from the Jhansi district, further west, attached to *D. bulbifera*, very probably by misapplication. But ka nu wa, kha nu wa or khi nu wa in the northern districts of the Central Provinces administration is a race of *D. alata*; and the name is also so used

in Baghelkand. It does not appear profitable to say more upon these, except to call attention to the use of *kikare* or *kinkari* for edible *D. pentaphylla* as well as the edible *D. oppositifolia* in the Ali-Rajpur State of southern Rajputana, especially to bring to notice that in the Seoni district *kirachkand*, and in the Balaghat district *kirchikand* and *kircha* are applied to *D. oppositifolia* and lead to the Gondi *kiras mati* of the same application, in a way which suggests that the names *kikare* and *kinkari* should rather be attached with *kras mati*, to *D. oppositifolia* than to edible *D. pentaphylla*.

With the sanskritic noun *kand* or *kanda* a note on p. 139 has dealt sufficiently.

Names in the northern part of the Deccan—penetration of Sanskritic names.

It is well-known that more or less upon the line of the tropic-of-Cancer, India presents a barrier of partial wastes: these were the wastes which made it difficult for the Moghal empire to conquer the Deccan, and they must have offered in like manner though perhaps in lesser degree obstacles to penetration by earlier organised states. There is a central way through the wastes past Khandwa and the fort of Asirgarh. Upon the west of that way the non-Aryan Bhils have been able to maintain themselves; and eastward many non-Aryan tribes persist. Among these tribes sanskritic languages have now obtained a certain position, the result of which as regards *yam*-names is confusion. The most useful course in regard to the area is to bring to notice these names, and to hope that investigation may be induced thereby. One exceedingly obvious result of this infiltration of sanskritic elements is the appending of *kand* or *kanda* by way of explanation to a distorted non-Aryan, presumedly Kolarian, noun.

Down the line of easiest invasion, that is to say past Asirgarh, sanskritic names have penetrated most. It was by this way doubtless than *pendaluka* gave origin to *pendhia* and *pindh*, and *madhvaluka* to *mataru*, *matharu* and *matalu*: in much more modern times *alu*, *aru* and *ratalu* have become established on it.

L-names, north and north-east of Bombay.

There is an L-name for nauseous *D. pentaphylla* used by the Warlis of the forests north and east of Bombay,—*lon di* or *lund i*, which appears to be rightly identified with the word *loli* used on Mount Abu in Rajputana, not for *D. pentaphylla*, but for *D. bulbifera*, and also with *lowar* and *lurga* used for *D. pentaphylla* in the Jabalpur district. Southwards, but as far south as Belgaum, *lokh eri* is met with for edible *D. belophylla* and *D. oppositifolia*: it is not sound however to connect it with the above names. The Warlis call edible *D. pentaphylla* *alshi* or *ulshi*. *Kushi* has been received as a distortion of it.

B-names, across India (see the map opposite).

There is a B-group for nauseous *D. bulbifera* where, proceeding to the eastward, the Korkus are met with: it appears variously as bail, bayal, beliya, and bai-ili; and there is another B-group for nauseous *D. pentaphylla* among the Kols and Santals of the Chota Nagpur area, as boiang, boiom, byam and byang sanga. The last word sanga means "yam." In as much as nauseous *D. pentaphylla* and nauseous *D. bulbifera* have, as regards primitive man, the same utility, a connection between the two names bail and baiom is possible.

From various districts of the Central Provinces administration, Central India and the northern escarpments, have come to the following names:—baigunialu for *D. hispida* in the Mandla district, baijankanda for the same in the Mirzapur district, bajar for the same in the Kotah state, bhaserkand in the Raipur district, bhui k and in Berar, bajrakand for nauseous *D. pentaphylla* in the Hoshangabad district, bayanalu for the same in the Balasore district, belnikand for the same in the Betul district, bhaserkand for it in Baghelkand, bhusa or bursa in the southern districts where Eastern Hindi is spoken, and butigai in Savara: bihi k and is ascribed to *D. bulbifera* in the Raipur and Damoh districts, bolar k and and barakand in the Amraoti district, and botlakanda in the Raipur district. It is tempting to connect all these with either bail or baiom.

Through a large part of the area whence these B-names have been collected, a ceremonial meal is used by men of high caste, which they call bechandi, eating it on fast days as a sort of penance. This meal is made from the nauseous yams; and there is not a little reason for seeing in the first syllable of the name an indication of bail or baiom, the latter the more probable from geographic considerations.

Through the Birbhum and Midnapur districts of western Bengal, *D. bulbifera* possesses a series of B-names, bamla, bamli and bawla,—names quite well-known, and as baulaalu spreading into the Balasore district. Attention to them might possibly bring out some result of interest.

The Bhars of Gorakhpur use bank for *D. hispida*, and this word is slightly similar to the word barlang which has been received from the foot of the Sikkim Himalaya as denoting that same poisonous species.

Ch-names, across India (see the map on p. 146).

There is a Ch-series over the area under discussion of very wide distribution, and applied mostly to the poisonous *D. hispida*, but sometimes to the nauseous varieties of *D. pentaphylla* and to *D. bulbifera*. This name appears as chai, chain, chayan, chainkanda, chani, chatai and chatankand. It is

met with from the Thana district near Bombay to the district of Monghyr. Chedari kand reported from the Akola district, as applied to *D. bulbifera*, is possibly a derivative.

Ko-names for *D. hispida*.

There is yet another wide-spread set of names for the poisonous *D. hispida*: it is kolo kand, kulu kand, kulu sang, kolki, kulia, kulika and kolhua. These names overlap the C'h group, and extend through Orissa beyond it, but fail to reach its western extremes, for they end with the Melghat. Kolo kand means jackal's tuber, but that in its origin the group had anything to do with the Hindi word "kola—a jackal" is extremely doubtful.

With the B-group, the C'h-group, and this Ko-group we find three groups of names for nauseous or poisonous yams, spread across India in the belt of wastes and quite unlike any names found in or near the Himalaya unless bank and barlang can be of the B-group.

Various disconnected names.

Edible *D. pentaphylla* among the Korkus is called gobadu; and this name has been obtained from the Buldana and the Amraoti districts, in the form gogdu, applied both to *D. bulbifera* and to the edible *D. aculeata*: again from as far away as the South Kanara district has been received a name gokaru for edible *D. pentaphylla* of similar sound.

Waj, waz, or vaj is an isolated name for *D. hispida* used in southern Rajputana, and neighbouring districts of the Bombay Presidency: it seems to be a Bhil word. Saplai is another isolated name for the same species, received from the Kotah state.

Palri is a third isolated name, attached to edible *D. pentaphylla* in Baghelkand. Pitasi is a fourth, attached to *D. bulbifera* in Singhbhum, but quite possibly it is connected with the Uriya adjective "pita—bitter."

These are a few further disconnected names:—

aman for *D. anguina* in southern Rajputana
ankul for edible *D. pentaphylla* in Belgaum
budh for *D. hispida* in Thana
gajaria or gajar for *D. pentaphylla* in Jhansi
galelua for a tuberous plant perhaps a *Dioscorea* in Jhansi
gota for *D. hispida* in southern Rajputana
manmour for *D. belophylla* in Jhansi
senrh, serh, or siar for *D. anguina* in Jhansi

Mati—a Gond word.

The Gonds stand out among the tribes of the belt of wastes, as having been able to achieve some small measure of organisation, and no doubt their language become more logical from that ability. Their noun mati stands for "yam" in a few names:—hirmati has not been identified: krasmati or kirasmati stands for *D. oppositifolia* in the districts of Hoshangabad and Balaghat:

nun mati is an unidentified *Dioscorea* of the Narsinghpur district; poturu mati stands for *D. anguina* in the Hoshangabad district. Krishna mati for *D. oppositifolia* in the Betul and Hoshangabad districts must surely stand for kras mati. Mati appears not to be applied to nauseous and poisonous species: and therefore while Hindi-speaking people may convert kras mati into kras kand, or in other names with mati, substitute kand, it is not the exact equivalent of kand.

Names of the Malabar coast, and the land behind it.

Mention has been made of the names waz for *D. hispida*, and loli for *D. bulbifera* as possibly Bhil names: oria for *D. oppositifolia* in Khandesh is perhaps of the same language.

Manokand has been received as for *D. bulbifera* in the Surat district. Mention has been made of the names used by the Warlis,—alshi for edible *D. pentaphylla*, and londi for nauseous *D. pentaphylla*. Mention has been made also of the way in which even the races of *D. alata* are known by nouns about Bombay, and that thereabouts *D. bulbifera* is known by the name karanda. This name, departing from karanda, varies to karandas, karandi, karinda, and karanza. As "carandi" it appears in Rheede's *Hortus malabaricus* of 1686-1703; presumably his staff, the chief of whom was Cascares, had met with the name in Malabar.

Rheede's staff, called *D. pentaphylla* both lava karandi and tilocarandi, the latter being edible. It is suspected that the karanda-group of names does not get applied to other than *D. bulbifera* until its southern extreme, where its usage is becoming vague. Rheede's staff recorded karodi as a Malabar name for *D. hispida*. Metz, Hohenacker's collector, sent out from Malabar *D. oppositifolia* as kurudu, and *D. tomentosa* as kurudupu. It must be assumed that these names belong to a K-group, especially as kuru kand can be heard in the Nasik district for karanda kand. Kedoni met within the Travancore state for edible *D. pentaphylla*, may be called to notice as perhaps having a connection also. But what the relationship of these can be to kon, which is a race of *D. alata* in Bombay, and konaghar which is *D. esculenta*, is a matter for investigation.

Kanji is said to be applied to *D. oppositifolia* in Travancore; but from the districts near Bombay to Goa kanji, kangia, kanangi, kangar, kanang, kankari, always qualified by the adjectives kanti or katta indicate *D. esculenta*. This adjective means in these combinations "less sweet," and is necessary because kangi unqualified is the introduced Sweet potato. It is very interesting that the plant which must have been the longer established should be that requiring a distinctive adjective.

In the Marathi language shataveli or chataveli stands for edible *D. pentaphylla*: and these words in the south of

1 -veli or -vel and all the similar terminations of this series indicate climber, from near Bombay to Ceylon, and on the Coromandel coast.

the Bombay presidency are changed to shendwel, shendowel and shendovail. They are names well established.

The name chenyei recorded by Dymock as indicating *D. tomentosa* is of the group. Dymock was excellent as regards languages, but he was not always fortunate in his determinations of Dioscoreas; so that his spelling of the name may be accepted, but his statement that it belongs to *D. tomentosa* doubted.

In Travancore chaval or chavalli occurs and belongs to *D. pentaphylla* at least in part. It seems to be a name of the same series: and this is interesting because with it we have:—karanja, possibly appearing in Travancore as kedoni, and shendwel appearing as chaval, both looking as if derived from pre-marathi or pre-malayalam words. It is permissible to recall the Ch-group of the belt of westes, and to suggest that the first part of chataveli, etc., contains it, the second indicating climber. If it should be so, then the Ch-group is carried right from Monghyr to Travancore as on map No. 6, its absence from the Nizam's dominions and other adjacent parts being only an accompaniment of the rarity of yams therein.

Kavalli is a word in sound near to chataveli, but probably very distinct. It is applied to edible Dioscoreas chiefly in the Tanjore district, but passes through to Malabar. In Tanjore it indicates *D. alata* almost always: but satik kavalli indicates cultivated *D. bulbifera*. On the Malabar side it is less strictly,—one might say less accurately,—applied, so that Rheede's staff ascribed it as kavalli kacchel to *D. oppositifolia*, and as nath kavalli it is *D. belophylla*, both these being edible wild yams.

Kacchel is applied to edible yams in Travancore: and there are nine instances in the following list. Kaju or kachu replaces it in the Nilgiris. Kondol has the same meaning in Ceylon.

The Tamil word kilangu is quite distinct in meaning, and must be translated "tuber": but as valli kilangu it means "yam." Utterly inedible bulbs etc., are kilangus. This word also passes a little to the Malabar side: but gadda and genasu, respectively in Malayalam and Kanarese stand for "tuber," and hold their own against it.

Further names in Ceylon.

The word kondol has been mentioned: alla replaces it in the Cinghalese language. Kilangu for "tuber" penetrates into Ceylon with the Tamil language.

Names of the Coromandel coast.

Kilangu is a very common word; and so is valli kilangu—the equivalent of yam plant: *D. alata* is vettilai valli kilangu or "the yam plant with a leaf like Piper

Betle." Such a periphrasis for a plant of undoubted familiarity is interesting, and its very length forbids its universal use, so that *peru valli kilangu* that is "large yam," *pedu chari valli kilangu* or "Pondicherry yam plant," *sakkara valli kilangu* or "sugar yam plant," etc. seem to suffice to denote races of *D. alata* without the use of the descriptive part about Betle-leaf. *D. esculenta* is defined as *siru valli kilangu* or "small yam plant" and as *mullu velli kilangu* or "thorny yam plant": *D. bulbifera* and *D. pentaphylla* receive the names of *kadu valli kilangu* which means "wild yam" and of *mallai valli kilangu* or "hill yam": *D. tomentosa* is the *nul valli kilangu* or "fibrous yam."

It can easily be seen from the list that in the names from the Malabar side containing *kilangu* less intelligence, with probably more jungle-lore, is displayed, than in the names from the Coromandel side.

Numerous words through the Circars.

Proceeding northwards Tamil gives way to the Telegu language, and Telegu to Uriya, while at the back of them occur languages such as Savara, the whole interacting in a complicated way. In the Cuddapah district *D. tomentosa* is *nulugoddalu*; edible *D. pentaphylla* is *yella gaddalu*; *D. oppositifolia* is *yella gaddi* and *D. tomentosa* is said to be *burdigaddi*. In the Kurnul district *yella gaddi* is *D. oppositifolia*. In the Warangal district, the same in the case; also a *Dioscorea* supposed to be *D. pentaphylla* is *chunchugudda*; *D. hispida* is *sunna gudda* and *nulla sunna gudda*. In the Chanda district *D. bulbifera* is said to be *nulla gudda* and nauseous *D. pentaphylla* is *punda mohra gudda*. In the Godavari district *nulugeddalu* is used for *D. tomentosa*. Passing over the Vizagapatam district, *nulla ginni geddalu* is *D. bulbifera* in Ganjam, and *D. hispida* is *tella ginni geddalu*. At the back of the Ganjam district the Savaras call *Dioscorea* *gai*, so that we get among them, *adabgai* for nauseous *D. pentaphylla*, *butigai* for *D. bulbifera*, *barogai* for *D. tomentosa*, *gadigai* for *D. oppositifolia*, *margodigai* for *D. esculenta*, *parogai* for *D. glabra* and *tumangai* for *D. aculeata*. It is possibly best to translate all these G-nouns by tuber.

Beginning with the Godavari district *dumpa* is met with. In that district *tega dumpa* is *D. alata*; *vypa dumpa* is nauseous *D. pentaphylla*, *nula dumpa* is *D. tomentosa*. In the Vizagapatam district *pedumpa* is *D. hispida*, *sisi dumpa* is *D. bulbifera*, *rajamohandumpa* and *eddutokadumpa* are evidently *D. alata*. *Dumpa* is also to be translated by tuber.

Tega, meaning a climbing plant, is used as a noun for *Dioscoreas*; and as regards the names in this list, with one exception, is only within the two districts of Vizagapatam and Ganjam; *billa tega* is *D. glabra*; *muragadatega* is *D.*

esculenta; *nula tega* is *D. tomentosa*, *pandi mukha tega* is nauseous *D. pentaphylla*, *tivva tega* (the words meaning wild climber) is the same, and *vainur tega* is *D. hispida*.

Palleru tega, a name recorded by Elliott in his *Flora Andhrica*, has not been identified.

Pendalam, as said, from a sanskritic language and descended from a word near *pindaluka*, is used only in the area where *tega* is current. In the main it designates *D. alata*, but not entirely, as *kaya pendalam*, meaning "vegetable pendalam," is *D. bulbifera*, and so is *malaka kayu pendalam* and *mallai kaya pendalam*, while cultivated *D. pentaphylla* has the name *moyyaku pendalam*, which is obviously the same as *malaka pendalam*. Further Elliott has a name *radraksha pendalam* which he ascribes to *D. bulbifera*, the similarity of the bulbils to *radraksha* fruits (*Elaeocarpus Ganitrus*) giving rise to it.

It seems as if *tega* and *pendalam* are used as more or less contrasting nouns: and if so, then *tega dumpa* occurs in the Godavari district because the application of *tega* is somewhat altered: it was found to indicate *D. alata*, which is the species that *pendalam* in the districts to the north indicates. If this view is correct then it is of considerable interest that over those two districts, Vizagapatam and Ganjam, the people should distinguish by nouns the cultivated from the wild *Dioscoreas*, whereas south of them the one noun covers both; and this is just as another noun does to the north. This last noun is the sanskritic *alu* which in Orissa has a wide application: and there *pendalam* has no place. The isolation of *pendalam* is then like the isolation of the Burmese *myouk*.

If *malaka pendalam* and *mallai pendalam* could have, as has been suggested by one writer, any connection with the Straits of Malacca, these names would possess a great interest, but it may be assumed that they have none.

Further names in Orissa and Chota Nagpur.

Cherango and *narenja*, *naringa*, or *nadanga* are nouns of this part of India. The first extends from the district of Ganjam into the district of Puri and changing to *cheranga* *kand* appears also in the district of Raipur. It is applied to *D. aculeata*. *Narenja* is applied to *D. oppositifolia* in the district of Cuttack, *naringa* and *nadanga* to *D. tomentosa* in Ganjam, and can be traced in the names *naretagalu* or *nari tega* for *D. aculeata* in the Vizagapatam district, *naregenasu* in the Malabar district and *nari gaddi* in the state of Travancore also for *D. aculeata*. As *D. oppositifolia* is not unlike *D. aculeata* there is little surprising in the application of this N-name to both species. But what is the origin of the name? It has got the range of the Ch-series discussed on p. 149 and to which *cherango* probably has to be added.

It is possible that the Ganjam application to *D. tomentosa* is incorrect,—a confusion with the adjective “nuli—thready.” The appearance is that an Na-group of names for wild edible Euanthiophyllous yams, exists with a wide distribution through India, so forgotten that what once were nouns are now used as if adjectives. Nunetya recorded for the Ganjam district as belonging to *D. tomentosa*, belongs on the other hand to the “nuli—thready” group of names and not to this (see p. 134). But *hargonari* may contain a word of the series: it is ascribed to *D. bulbifera* in Manblhum.

Orissa and Chota Nagpur offer little more of interest than has already been noticed. *Masiba* or *mosia* is an Uriya word for yam. *Sanga* is the Kol word for “yam” and *sangis* its Santali equivalent: there are several combinations of *sanga* in the following list; but it is to be said of them that they are not very discriminatively applied.

Jahrengis edible *D. pentaphylla* in the Ranchi district.

Karba, *karaba* or *korba* is nauseous *D. pentaphylla* in the several districts of Orissa. *Garaba*, said to be *D. bulbifera* in the Cuttack district, and *haradbbu*, said to be used in the Ranchi district for the same, appear distortions of *karaba*.

Nakoe, *nakua*, or *nakwa* is *D. tomentosa* or *D. pentaphylla* in Chota Nagpur, Mirzapur and Baghelkand. *Piska*, and *pitasi* are names for *D. bulbifera* among the Santals; and *pitasi* is the same in the Singhbhum district, either Kol words, or connected with “pita—bitter.”

Tamalia is *D. oppositifolia* in the Cuttack district.

An isolated name in Tirhuti and Behari.

In Tirhut and Behar one very isolated and possibly interesting name exists: it is *suthni* used generally for *D. esculenta*, and it is quite unexplained.

Throughout Bengal and the plains of Assam *alu* is the general word in Bengali and Assamese for yam, and all the species occurring are classed by adjectives under it.

Names of the Andaman islands.

We know no more than *gona* among the Beas and Balawa tribes, *mina*, among the Yeras and *konuda* among the Bojgyahs for *D. rerans*: for *D. pentaphylla* *kornmu* among the Yeras, and *charodi* among the Bojgyahs:—names extremely diverse.

The borderland of the Assam-Burma hills.

The hills between Assam and Burma contain four distinct groups of words for yam. In the first place there are the words of the T-group which, as already mentioned, occur as *tha* in the Garo language, as *tha* or *ta* in Chachari, and seem to pass down the western side of Burma in this. Next there is the *pha*n

of the Khasias. Thirdly there is the *rui* of the Mikirs or *re* of the western Nagas. Lastly *tsu* or *dzu* occurs in the Naga language in *tsupre pyadzu* and *manje dzu* for races of *D. alata*. What there is further eastward is not known: south-eastwards is a land of the K-words, and it is convenient to proceed with them next.

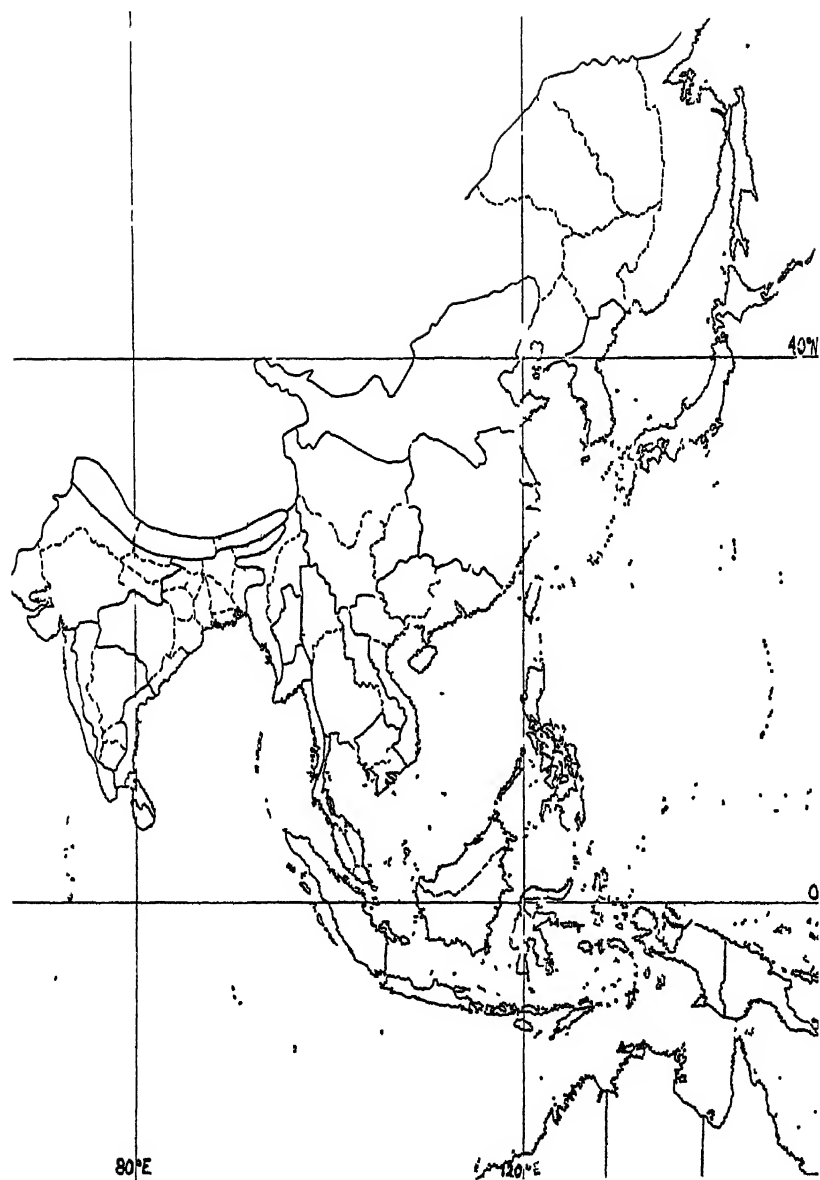
The K-group of words of Indo-China, etc.

The map following gives a number of these words; one of them is met with in Japan; another in the Liu-kiu islands; and China, it has been remarked, possesses them in a secondary degree. The Mon-Khmer *kh o a i* is at the present day the most wide-spread word among them. Of words closely akin we find these limits:—there is *ha u a i* among the Kamees of Arakan; and *huk a i* as well as *kh a i a l u* in the Sylhet district of India seem to represent it: *h r a* in Chin and *h o* in Shan represent it. As *h r a* it approaches the *re* of the Nagas. The Burmese are believed to have burst into their country from the north: they may, then, be held to have burst into the area of these K-names, which being foreign to them, they misused: *kh o a i* or something like it, gave them their word *ky we* which now means *D. hispida*: a compound of *kh o a i* or a word of the group gave them *ka d u* which universally denotes *D. bulbifera*; *h r a* gave them *ka let* which denotes *D. aculeata* and seeing that *ka d we - u* is sometimes used for *ta h d we - u* denoting *D. esculenta*, it is possible that the series gave them this last. The Siamese who pushed down parallel to the Burmese from the north, use of this group the words *k o i* and *k l o i*.[§] In Burmese, where *u* is tuber, a Burman commonly appends *u* to the yam-names given: a Siamese adds *m u n* in the same way, *m u n* being the Siamese word for tuber.

Van Lijnden in the *Natuurkundig Tijdschrift voor Nederlandsche Indie*, 39 (1874) p. 314 stated that the word *kh o a i* is used for "yam" in the island of Solor. In the Watubela islands of the Banda Sea *ku w i* which is very near, is used; and Rumpf gave *ka e e* as indicating *D. pentaphylla* in the island of Sumbawa.

A word of the K-group is to be found, it seems, among the negrito tribes of the north of the Malay Peninsula. The mixed negrito-proto-Malays, such as the North Sakais and Besis, use *be k o i*, *ba k o i* and *be k o y a* as well as *ku o i*, *ku o e*, and *kie*, as do the Sakais of Perak and central Pahang. Now these folk pick up and clip Malay words so that with them 'be- may stand for the Malay *u b i*: it is therefore a matter for someone to investigate, whether the words *be k o i*, *ba k o i* and *be k o y a* are attempts at *u b i k o i* that would be yam-yam,—the exact equivalent of the Siamese *m u n k o i*, or are not.

[§] Perhaps the insertion of 'l' by the Siamese into *k o i* so that they make it *k l o i*, is to be accounted just as the 'l' in the Samang words *klab* for *D. hispida* and *k l a w o n g* for an undetermined wild yam.



MAP No. 9

Hoi for *D. bulbifera* in the Hawaiian islands, though so remote seems the same: from Hawaii, it has been taken to Tahiti and the Friendly islands, apparently in the last century.

There are a number of words through Malaysia appearing to have connection with the above, so many indeed that they have not a little interest. The following have near sounds:—katak for *D. pentaphylla* and perhaps another *Dioscorea* in Javanese; kapo, kapu, kapots and kaput for various species in northern Celebes; kayus for *D. alata* or *D. hispida* or *D. pentaphylla*, and kalut, kolot, kulot, karot, karoti and orkot for *D. hispida* widely in the Philippine Islands including the Sulu archipelago: katama for *D. warburgiana* in Celebes: kayuru apparently for *D. hispida* in Java: kapak in the Sasak language of Lombok and kasimun in Timor for the same species: kamangeg for *D. luzonensis* in Ilocano and kamiging for *D. esculenta* in the Bikol language of the Philippines; kasi for *D. pentaphylla* in the Igorot language: kao in Bima; kawai for *D. esculenta* and kaile for *D. pentaphylla* in Fiji. Karondu stands for yam in the Kangean islands, which are between Celebes and Java.

There are numerous other names commencing with the same sound:—konuda and kornmu in the Andaman islands: keladi and kombili, widely in Malaysia; kuduk in Borneo; kobag, kirini, kiroi, kinampai in the Philippines chiefly in Tagalog: kowui in Solor; and kutabi and ketabi in Sumba: kou in New Caledonia: kowar, karro and kuri-janga in Queensland: kuri in Lord North's island; kuku, korengu and karokaro in Fiji: and lastly it may be remarked that kumaa is found by the side of umaa for the Sweet potato in the Pacific.

The ubi-group of words.

South of the lands where words near khaai chiefly run for yams are the words of the U-group on the map overleaf. Whether connected with the Burmese u or not it is impossible to discuss; the similarity however can well be indicated. Uvi is to be translated "yam"; but sometimes as in Fiji it almost means *D. alata*. As ovi it appears in Madagascar, and as ufi it occurs in Tahiti,—very wide limits for what is essentially one word. Search for a sign of it in Ceylon and Southern India gives no results. It is most curious how a proto-Malaysian stock reached Madagascar without leaving more distinct marks in Ceylon: but Mr. James Hornell in the *Memoirs of the Asiatic Society of Bengal*, 7 (1920) p. 234, states that the designs of boats upon the Indian coasts carry the marks of their passing, and suggests that there is proto-Malaysian blood in some of the tribes as instanced by the shape of the skull. As they carried their word ovi to Madagascar, then if they established themselves on the coasts of southern India or Ceylon, they carried ovi thither also. Why has it not persisted? Not equally do we look in vain in Java for signs of Sanskritic invasion.

Ubi gets the aspirate sometimes, and it has been suggested that h u b i which is met with among the Sakais is older than u b i as met with among the Malays. However there are few yam-names with the aspirate in Madagascar, and none in the remoter Pacific. It is chiefly in Java that the aspirate is met with as a well-established part of the name; for in Sundanese h u w i denotes a yam.

In eastern Malaysia in the place of u b i are some interesting names as:—w i for yam in Java; i w i and h i w u in islands towards the east end of the Lesser Sunda islands; w i w i, w i w i w a k and w i l i in New Guinea and the Aru islands. It is legitimate to ask if this word for yam is contained in w i n t o g or w i n t o for *D. laurifolia* in northern Celebes, and w i k a for *D. bulbifera* on the Morshead river in Queensland. The same twist of the tongue which turns the u b i of south Celebes into the i h u of Ceram, would turn the h u w i of Java into the h i w u of the island of Seru.

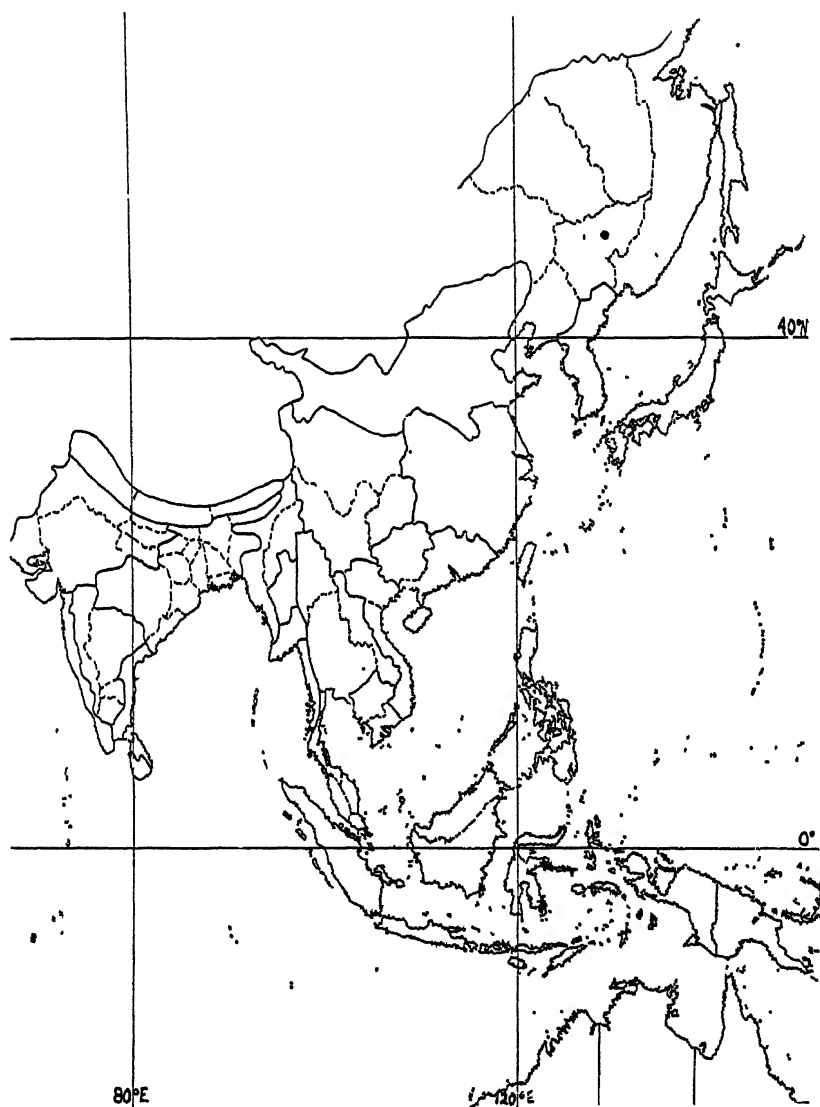
U b i and k h o a i have intermediates, and having on that account brought the two together, and suggesting that the ubi-group has supervened over the k h o a i-group in Malaysia, it is now necessary to turn to other nouns applied to Dioscoreas in Burma and Indo-China.

Further nouns of the north of the region of the K-words.

H p u t s a - u is used by the Burmese for *D. pentaphylla*; its origin needs investigation. It is a name very well-known, and almost universal in Burma. A m d a l a t a has been received from Chittagong as belonging to *D. bulbifera*. E r i s u m e r i of Northern Arakan for (? a race of) *D. alata* stands unconnected with any other words. L e l i e m used by the Chins for *D. hispida* may be connected with l i n the Dhimal word for yam. N a i is the Kachin word for "yam" or perhaps "tuber." D a m for yam in the language of Cambodia is equally isolated.

B-words that are found where the K-words and ubi-words are commoner on the whole.

The Chins have a word for yam b a i almost identical with a word already mentioned as used among the Korkus of the Melghat. The Chin b a i appears combined in b a i k a y with a word of k h o a i affinity, and as b e r a r, which seems to be b a i - h r a in use by the Shandus of Arakan; and very probably it appears in the b a i a l u of Sylhet. It is a great distance geographically from the land of the Chins to the Melghat and likewise a great distance to where such b a - and b e - prefixes are used as, in the Malay Peninsula, b a k o i or b e k o i or b e k o y a, by the North Sakais of the Pahang-Kelantan border: as b a k h o i by the Besi of Malacca; as b e l o g by the Senoi; as b i g a p by the Sakais of Perak; as b i h a n g by the Belanda of Selangor: in which the first syllable may well be a clipped u b i: so that these offer divergent interests.



MAP No. 9

In Malaysia there are two further series of B-names, which may have greater interest. The first contains *ba g a i* for *D. hispida* in Mangyane; *ba o n g* and *ba n a g a n* for *D. bulbifera* in the Visayan of Luzon and Negros; *ba y a n g k a n* for *D. pentaphylla*; *ba n a n* for *D. nummularia*; *b a l i a k a g* for *D. luzonensis* in Tagalog; *ba l l o l o n g* for *D. alata*; and *b o g a*, *b u g a*, *b o d o t*, *bo r o t*, *bo l o t* for *D. esculenta* in Ilocano and Visayan; *bo h a y a n* for a *Dioscorea* in Visayan and *b u l o i* for *D. divaricata* in Tagalog. The second is found in *bu*, *b u a r*, *b u k o* which stand for yam in parts of Sarawak, and in *b u l u* or *b u t u* common in Javanese. It must suffice to call attention to these words, adding in reference to *b u l u* or *b u t u*, that commonly some word for yam is prefaced to it my way of explanation, and suggesting that among Malays, where it appears as *u b i b u t u n g*, among Sundanese where it appears as *h u w i b u t u n g*, *h u w i d u d u n g* and *h u w i t u t u n g*, in Makassar where it appears as *l a m e b u t u n g* and in the Moluccas where it appears as *k o m b i l i b u l u* the original meaning of *b u l u*, etc., has become quite forgotten. Rumpf explained *u b i b u l u* as originating in the habit of the Butonese of growing certain races down bamboos (a bamboo being *bulu* in Malay, and see p. 169); but such an explanation is not acceptable.

A series of names should next be mentioned of rather wide use in eastern Malaysia. They are *a b a u*, *a b o b o*, *a b u b o*, *a b u b u*, *a h u h u*, *o h u h u*, *a h u a*, and *a h u o*. These are applied usually to the inferior species of *Dioscorea*, such as *D. pentaphylla* and *D. bulbifera*, as well as *D. hispida*. Celebes is their westernmost island and eastwards they spread through the Moluccas. *A h e i* and *a h e y* which Rumpf ascribes as Amboinese names to *D. pentaphylla*: *i a e* which he gives for Locho island: *e l a n* or *a ė l a n* or *a y l a n* or *m e l a n* or *m a ė l a n* which stand for yam in south Ceram approach each other and *a b a u* though *a h u a*. *A y w e l* used in Amboina for *D. pentaphylla* is of the group. Further eastward comes *a y a n* for yam in New Guinea, and *e n*, *e ė r* and *a y e r* for yam in the Kei islands.

The peculiar Burmese word Myouk.

Throughout Burma *m y o u k - u* is the tuber of *D. alata*. The word is changed to *m r o u k* in Arakanese. It is as peculiar as it is universal among the Burmese and Arakanese, and unlike the K-nouns it does not occur among the surrounding non-Burmese tribes. No special name suggests that the Burmese upon coming into their country from where such a plant as *D. alata* was unknown, after making an abrupt acquaintance with it, set great store by it.

Peculiar words in Malaysia for *D. hispida*.

Just as the Burmese distinguish *D. hispida* sharply from the other *Dioscoreas*, so do the Malays. The Burmese call it *k y w e*, a word which looks as if it is the equivalent of "yam" taken

from the language of the conquered, and applied to that one yam upon which the conquered were driven to subsist. The Malays call it *gadong*, whether they be the Malays of Sumatra or their offshoots in the Malay Peninsula. It is said by Warneck in his *Tobabatasch-Deutsche Wörterbuch* (and someone should confirm and extend the statement) that all yams are *gadong* to the Toba-Bataks, even the very best, so that the verb "*menggadong*" means "to eat yams" and even at times "to eat"; thus Warneck indicates for *gadong* a wider application than the Malays give, just in the same way as the Lios folk give to *khōai* wider application than the Burmese give to *kywe*, in both cases *D. hispida* being the species designated in the narrower application: and, if *gadong* can mean among the Tobas any yam as well as the sweet potato, it quite lacks the suggestion of poison which is usually in the word and can be considered as still in it when used as *gadungkayu*, that is "stick gadung" (according to de Clercq), for the Tapioca in Achin which plant also can be poisonous, and as *gadungtikus*, that is "rat gadung," for *Smilax Heltteri* and as *gadungchina* that is "China gadung" for *Smilax China*, the drug, in the Malay Peninsula and in Java and in Madura (teste Ridley in *Journal of the Straits Branch of the Royal Asiatic Society*, 38, 1902, and de Clercq, op. cit.). Marsden has *gadungkasturi* that is "musk gadung," as an orchid, certainly inedible.

It would be most interesting to be able to show that the words *kywe* and *gadong* have a parallel history and a measure of origin in common. *Gowi* used in Nias is intermediate. *Gadong* changes to *gadung*, *gadueng*, *gadhung*, *ghadung*, *gadu* and *ganrong*. The Sakais of northern Perak, northern Pahang and Kelantan use a name *gakn*, *gang* and *gong* for some edible tuber, probably of a higher grade than *D. hispida*. It is impossible to be sure that this use is degraded and not ancestral until more information is gathered. There is a name *gado* applied to *D. esculenta* in the Marianne islands: but as those islands are so far away, it scarcely helps towards an understanding. *Ganduy* is a word picked up by Father Kamel in Luzon about 1700 A.D. and applied to *D. luzonensis*. *Gayos* is a Visayan word for *D. hispida* and in it the *G* has come from a *K*,—*kayos* (see p. 163 forward).^{*} The Javanese name for *D. hispida*, *kayuru*, the Lombok name, *kapak*, and the Timor name *kasimun*, after the initial letter are remote from each other.

The Bali name *diangga* or *jangga* is remote from any other name recorded. *Seapa*, recorded for *D. hispida* in Celebes, will need mention later. *Ulibita* or *uhulibeta* used in the Moluccas stands remote also from other names, and so do *mamo* used in the Bikol language, *namiorname*, a name in use in Tagalog in Luzon and in Mindoro, and *ondo* or *ondot* used in Ceram, or *orot* used in Visayan.

^{*} So Kombili gives *gembili* in Java.

Some isolated nouns of Western Malaysia.

For *D. pentaphylla*, the Sakais have a peculiar word: they call it jabbet, jayat, or jaya. No near name is known, none nearer than rabet which is used in the island of Madura in an equally isolated way for *D. pentaphylla* and *D. bulbifera*, in conjunction with another noun or an adjective appended by way of distinguishing which rabet is indicated. By the side of rabet, in Madura, another word is applied to *D. bulbifera*: it is kaburan; but the exact incidence is doubtful, and it would be well for someone residing in that island to sort out the application of rabet and kaburan. Kaburan is near to kaburo or kasuvo which means *D. bulbifera* in Ternate.

The Pangan of the Malay Peninsula use so or sod in a way which is not satisfactorily known: and among them as well as allied tribes are words commencing with T., to which attention should be directed likewise. They occur alongside the clipped Malay words that these tribes use; and are:—takob a “kind of yam” eaten by the Pangan of Teliang; taku for a root apparently the same among the Pangan of Ulu Patani or tako among the Pangan of south Litch; and takob, a word used by the Semang of Kedah. Other nouns commencing with the same sound are talis perhaps for the Sweet potato among the Semang in Perak, tela or katelah among the Semang of Perak which becomes tila with the Mentera, Belandas and Jakuns, and tegak which is the tapioca among the Kenaboi. There is also a tuber called tawi among the Senoi of Pahang, a Caladium called to-lambo among the Semang of Kedah, and the Sweet potato seems to be toana among the Jakuns of Malacca. Tela and tila as from ubi kastela through katela are the only words of these which can be explained easily.

It may be mentioned here that “yam” is tira at Krokong in Sarawak and tis in northern Celebes.

In Java senka is a word the application of which is doubtful, and which may have been the zenka or yenka of Celebes where it is *D. esculenta*.

Ghuwak is applied to *D. alata* in the Kangean islands.

S-names in Eastern Malaysia.

The island of Bali uses the words samoan, samowan, and samwan for *D. pentaphylla*.

There is an interesting concentration of S-names in eastern Malaysia which may have a cause. There are:—(1) sikari for *D. hispida* in Bali alongside samoan; (2) sikapa, siyapa, seapa or sikapang in Celebes for the same; (3) siahi, siaffu, siavu or sahu for *D. esculenta* in Amboina; and (4) sayawu, sayafu, sayabu, sayahu, sayahul, siyau and siyapu for the same in Celebes and in Ternate and the

Moluccas. Can *~u* (*çu*), for yam in Tonkin contain the same root, the words *sampitsuku* and *sahe* for yam in Sarawak, and the word *sapang* for *D. pentaphylla* in Luzon? If so, then *senka* and *sikapa* used in Celebes are allied, as well as *sunda* or *suda* which indicates a *Dioscorea*, probably *D. nummularia*, in east Java and Bali.

Some perhaps intermediate names of Western Malaysia.

Heri and *heli* in the Moluccas indicate *D. alata*, and as *heriputeh* or white *heri* *D. bulbifera*, perhaps in the cultivated state. *Ima*, *imah* and *imati* indicate *D. alata* in Ternate, where *ima kastela* or "Spanish *ima*" is the Sweet potato.

Names of *D. esculenta* in the Philippines.

In the Philippine islands *tuqui*, *tugi*, *togung*, *tugui*, *tongo*, *tungo* and *dogue* indicate *D. esculenta* in the Tagalog and Ilocano languages. Except that the word appears to have reached New Caledonia, and unless the Tonkin *tu-su* is, as it may be, the same, it stands isolated. The Philippine yam-names usually begin with a B or with a K: *D. esculenta*, however, has no recorded Philippine name commencing with a K, except *kamiging* in the language of Bikol: though of names commencing with B it possesses such well-known ones as *bodot*, *borot*, *bolot* in the Visayan language and *boga* in the Ilocano language. Of the three languages Tagalog had in the 16th century less civilisation or outer influence than Visayan, but now possesses more.

Luttu is recorded as an Ibanag name for *D. esculenta*, and the word is very similar to *luktu* which is an Ifugao name for *D. alata* and *tolutu* which belongs to the latter according to Rumpf in Banda.

But the Ifugao and Ibanag are hill-folk of the centre of northern Luzon: so that the resemblance of those two words of theirs to that from Banda is probably accidental.

Other Philippine names.

There is a great divergence between the words of the three predominating western Philippine languages,—Ilocano in the north, Tagalog in the centre and Visayan in the south. In all three languages the Malay word *ubi* is used for *D. alata*; but races get nouns applied to them which need no generic word, such as *ubi*, to complete them: *ballolong*, *bininag*, *dinogo*, *tamis*, *tubayan*, *tinuke* and *tumuktok* are such names; and it is to be suspected that *kinampai* and *hampas tagbalang* are others: but while it is known that one of two of these are Visayan, it may be that others are Tagalog. It will be noticed that several of them commence with the letter T, *i.e.* the initial

letter of the Tagalog name *tugui* for *D. esculenta*. The diversity of the languages in the names for other species of *Dioscorea* may be put into a Table,

	Ilocano	Tagalog	Visayan
<i>bulbifera</i>	aribukbuk	ubi-ubuhan utong-utongan	pologan, pulugan or pugang baong, banagan, bohayan or bayang-kan
<i>pentaphylla</i> and like species	—	lima-lima	sapang
<i>hispida</i>	karot	kalut, kayos nam	kolot, gayos, orkot, orot
wild <i>Enantio-</i> <i>phyllous</i> species	dulian or durian kamangeg aribubu — ganduy	baliacag, buloi kiroi, kobag, or kirini — — — pakit ubag and ubing hasoh mayatbang	baliacag orot — — — —

On doing this the K-names appear to be more conspicuous in Tagalog, but extended through all three in reference to *D. hispida*, and in Visayan now peculiarly departing from their probable original.

The Igorots of the mountains of northern Luzon call *D. alata* *ipoi* and *D. nummularia* *kasi*. The Bikol language contains the words *pulugan* for *D. bulbifera* in which it is like Visayan, and *mamo* for *D. hispida*. The Bagobos of Mindanao have *dadakan* for *D. bulbifera*, *pari* for *D. Cumingii*, and *banan* for *D. nummularia*. Of other languages, *duyan* in Pangasinan is almost the Ilocano word *dulian* and is used similarly and *alabalukbuk* for *D. nummularia* possesses a certain resemblance to the Ilocano word *aribukbuk*. *Karoti* is used in Sulu as *kolot* is in Visayan.

Complexity of names in Borneo, New Guinea and Australia.

Borneo, as far as we know anything of the names used for yams in it, helps very little: it has B- and K- names; and there is the word *tira* which is possibly of a common origin with the word *tis* used for yam in Minahasa.

New Guinea is at present too little known, and the enormous linguistic complexity there will long render comparisons uncertain. *Farkia* is a quite isolated word for yam obtained thence; and the few words out of the Hanuabada language here recorded, suggest that the Papuans of the south coasts of British New Guinea apply very different words to various species of *Dioscorea*. The words to be found here are:—*bakuta* for *D. pentaphylla*, and *boku* apparently for *D. nummularia*; *diba* for *D. esculenta*; *ka u* for *D. bulbifera*; *lebeta* for *D. pentaphylla*; *makoda* and *moiva* for wild races of *D. alata*, and *maloa* for *D. pentaphylla*; and *tailukawa* for *D. esculenta*.

The Queensland names are similarly diverse. In these pages will be found *am pu* for *D. transversa*; *anyorbil* for *D. bulbifera*; *daiperi* for the same; *guiaha* or *gyah* for *D. transversa*; *kalkur* and *karro* and *kurijanga* for *D. bulbifera*; *kowar* for *D. transversa*; *unwu* and *wokai* for *D. bulbifera*. The names of the rivers upon which they are used can be ascertained from the list; and it is to be remarked what diversity is in them.

Western Australia supplies the following names:—*kowar*, *mjarrah* and *warran*, all for *D. hastifolia*.

With the names from New Caledonia it is at present impossible to deal: specimens for accurate determination of each of the very many yams enumerated thence should be obtained. When this is done it will probably be found that almost three-quarters of the words are used to indicate varieties of *D. alata*.

Names in the Pacific.

In the western Pacific lie the Marianne islands, at the south of which is Guam island. In these islands *daga*, *dago*, or *dagu* stands for yam. *Gado* in Guam for *D. esculenta* looks like the same word. *Nika* however seems the general word for this species.

In Fiji seven known names for *Dioscoreas* commence with MB- (written as B), eight with K., and if *ti* and *tivou* be counted one, seven with T. *Ubi* is used for yam, and so is *ti*; and in the Nadroga language *vitua* is "yam": *tika u* supersedes *ubi* in places. *Ti* has been explained as a young yam, and as *D. Seemannii*. Most of the recorded names stand for *D. alata*, as has been stated on p. 138: but there is an MB- or B-name for *D. pentaphylla*, namely *mbulo*, and a T-name, *tokatolu*, which may appear as *kaile tokatolu*: and *D. bulbifera* may be called *kaile* without any qualification. There is a K-name for *D. esculenta*, *kawai*, which is the nearest approach to *khoei* in

the Pacific, and probably closely related to it. *Sarau* and *hara u* are used in the Nadroga language for *D. esculenta*: *rau u* is ascribed to *D. Seemannii*.

In the Samoan group, *lega* is *D. pentaphylla*, and so is *pilita*.

In the eastern Pacific, the Tahitians use *ufi* for yam and the interesting word *hoi* is among them, probably having been brought not so very long ago from Hawaii, whence as is well-known the natives made most wonderful voyages. This same word is also in the Friendly islands. *D. alata* does not go so far north as *D. bulbifera*, and in Hawaii it yields place to *D. bulbifera*, so the word *hoi* on reaching the Tahitians and the Friendly islanders who live in the belt of *D. alata*, denotes *D. bulbifera*.

The words *patara*, *paraara*, *panara* or *paanara* denote *D. pentaphylla* in Tahiti: they seem to be akin to the word *pilita* of Samoa which has been mentioned and to the first part of *pua uhi* used in the Marquesas islands.

There is recorded a Hawaiian word for yam *nala* which either stands apart, or might equal the Fijian word *ndala*.

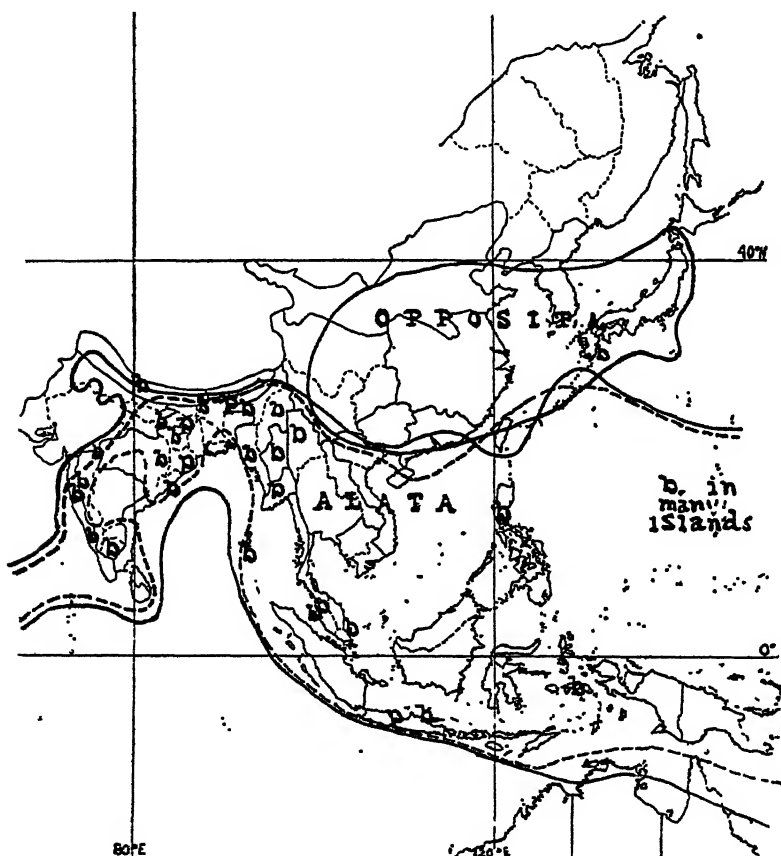
It seems well to call attention to the "ala" which recurs in the Pacific in several other words. It is in *ala-ala* used for the bulbils of *D. bulbifera* in Hawaii; in the Fijian names for a race of *D. alata* *alakora* and *moala*, while *Colocasia* is *ndala* and the Sweet potato *kumala*: but it must be said that *ndala* is often *ndalo*, and *kumala* becomes *kumaa* in the Marquesas islands. In Shortland island, one of the Solomon group, is the word *alapa*, but the similarity of the word is probably without historical value.

Origin and adoption of *D. alata* and *D. opposita*.

One hopes out of the collecting of vernacular names to be able to learn something of the past history of cultivated plants, which as regards Dioscoreas means of the five species *D. alata*, *D. opposita*, *D. esculenta*, *D. pentaphylla* and *D. bulbifera*, whose present asiatic distribution is indicated upon the map on page 166. But for that purpose the wanderings of tribes and peoples must be not unknown, lest the bringing of a name to a cultivated plant be confused with the bringing of a cultivated plant to a name. Unfortunately only a few of these wanderings are adequately clear.

Botanical considerations indicate that *D. alata* came into the service of man in Eastern Asia about lat. 15-25° N. and *D. opposita* to the north of it: but as *D. opposita* is far less developed in cultivation than *D. alata*, it may have come into cultivation much later. The reasons for so placing the origins are as follows. In the first place it must be recorded of *D. alata* that when found wild it is never beyond the suspicion of having persisted from cultivation: and that it cannot persist indefinitely without aid appears more than probable. It is what Professor L. H. Bailey calls a cultigen or product of culture: and therefore it is necessary

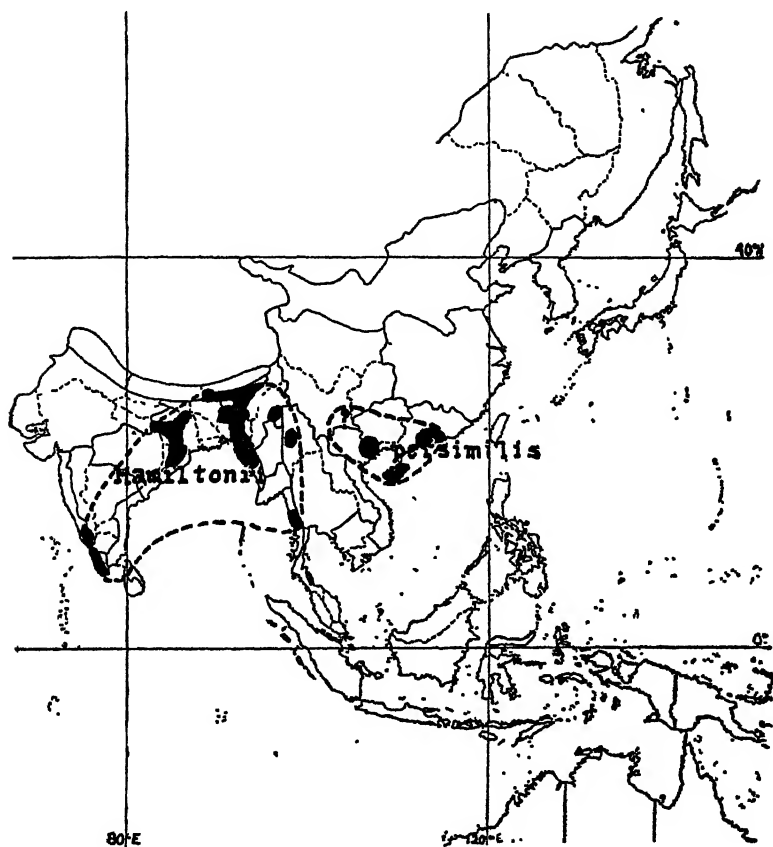
to look for its ancestry not in the finding of wild representatives of it, but in allied species. Upon doing so we find its closest allies to be the two species *D. Hamiltonii* and *D. persimilis*, found over the hilly parts of Asia indicated in map No. 11; and it would be more or less within the area of their distribution that *D. alata* arose, whether from the one or the other, or from both or from a common ancestry. A further consideration makes an origin to the southward look improbable. The reader should turn to map No. 1 where the dis-



Map No. 10. Area in Asia of the cultivation of *D. alata* (continuous line makes boundary), of *D. esculenta* (broken line makes boundary), and of *D. opposita*. Places where *D. bulbifera* is known to be cultivated are marked (b), and where *D. pentaphylla* is (p.).

tribution of the Enantiophyllous Dioscoreas is given, in order to understand the argument. In that map it is shown that the western Malay islands are a large centre for the harbourage, (and presumably have been a large centre for the development) of

species of the section, and that southern India with Ceylon afford a second centre, and further that there are three centres in a line to



Map No. 11. Distribution of *Dioscorea Hamiltoni* and *D. persimilis*.

the north. Now because the perennial humidity of the Malaysian centre, leads to long growth in its species, and to less storage of food against an abrupt and vigorous push in a new season than the climates of marked seasons, the Malaysian stock would promise less to man than the stock of lat. 15-25° N.; and as the same may be said though in a less measure of the southern India with Ceylon centre, a theory of the origin of *D. alata* in the north of the Indo-China region is seen to be reasonable.

Far back in time the regions now India and China emerge out of the mist of early history in the process of a conquest from primitive folk by peoples out of western Asia, from beyond the area of food-Dioscoreas. One of these conquering peoples, the Chinese, destroyed with habitual thoroughness the primitive folk of northern

and middle China and then pushed south: the other, the Aryans, destroyed similarly the earlier inhabitants of Persia, and drove a wedge down the plains of northern India. Ultimately both reached the sea, and took to the use of it lightly, but enough for the Chinese to sail the China sea, and for the Aryans to sail the Bay of Bengal, and go forward into southern Indo-China and western Malaysia: then they met but that barely two thousand years ago. In the long succession of centuries before the meeting: the alphabet of the Aryans had penetrated north and east into Thibet, Burma, Siam, to the Shans and to the Cambodgians, while the writing of China has spread north-east into Japan, the Liu-kiu islands, Corea and south only into Annam. It is clear that when history dawns there was a belt of relative barbarians between the two horns more influenced by the southern than the northern culture.

These barbarians, one locates in or about the presumed original home of *D. alata*. But the other species, *D. oppositu* took origin in or beyond the northern culture.

Out of the welter between the horns, various tribes emerged into history; the Annamites seem to have given way southwards a little, and are probably typical of what happened in general; but the Burmese seem to have leaped from far back in Asia, and when they had established themselves in the climate where Dioscoreas grow, they called the important one,—*D. alata*—by a name peculiar to themselves, namely *myouk*, but took names beginning with K for the others. If this theory is correct that they burst into an area of K-names, and if the K-names on map No. 8 are rightly put together, then the very wideness of the range of these names points to the former existence,—pre-Burmese,—of inhabitants in Indo-China who were not so barbarous as to be cut up into small communities, but had a wide-flung language or group of languages. They are demonstrated by these names conversant with yams and may be held as considerable consumers of *D. alata*.

Earlier than these, it is impossible to see: but the origins of *D. alata* are undoubtedly earlier.

The peoples who gave to *D. alata* its widest extension prior to European influence, were, however, not these inhabitants of its country of origin, but the Malayo-Polynesians, who migrated along the tropics, carrying it in the one direction to Madagascar, and using it in the other in the farthest islands of Polynesia, Hawaii excepted. That they carried it, is demonstrated by the occurrence of *ovi* in the former, and *ufi* in the latter as forms of what a Malay calls *ubi*, denoting “yam” thereby, and chiefly *D. alata*. Cultivated had they got it, and by cultivation alone they maintained it in regions where supposing it sufficiently safe from wild animals, the vast growth of tropical vegetation would not have left it room to persist. They must have been the first to take it to Madagascar, though they may not have been the first to take it to Tahiti, etc. But whether first or not, they would transport new races to new places.

Unfortunately we do not know when the one or two or perhaps more, waves of Malaya-Polynesian migrants went west past Ceylon to Madagascar: though the closeness to each other of the words makes it not exceedingly remote; but as no Sanskrit appears in Madagascar, the last wave was before Aryan rulers made kingdoms in contact with these adventurous voyagers, *i.e.* before our era.

One must suppose it an important food for voyagers to all the several nations who sailed the Indian Ocean later. Whether those of Asia extended its range or did not, is at present uncertain (see p. 124); but after the sixteenth century had come in, the Portuguese carried it to the Guinea coast of Africa and thence to the New World: and in the last century the need of yams for provisioning ships, chiefly whalers, in the Pacific, stimulated its growth in the islands of that Ocean, and may have led to a little extension. Races which keep got preference from the voyagers, and the reputation for keeping of that which in the West Indies is called the "Lisbon yam" and its transportation thither are connected. We also learn that *D. opposita* was somewhat grown for the whaling trade.

Man's first preoccupation in regard to *D. alata* would be to get bulk, and to make the tuber form near to the surface of the soil. Much later the tenderness of a deeply-earthed tuber would appeal to him, and if living in conditions sufficiently comfortable, he would afford the labour of the deep digging that the tenderer tubers required. His efforts thereafter had divergent directions,—to get bulky races, and to get delicate races, the latter normally going deep.

Rumpf tells an appropriate story of the way in which the cultivators of Buton who he adds glory in their knowledge of how to grow yams, endeavour to amalgamate the two directions: they bury a split bamboo horizontally in the soil, he says, having taken a yam-set of a race which grows two feet long, and they direct the yam tuber down this bamboo, thus they obtain a long tuber and can dig it at little cost. The wish that stimulated this device, has led to the selection of the peculiar group of varieties which recurve in the soil and even extrude unless earthed up. Most of the extremely recurving races occur in the Philippine islands and in Eastern Malaysia, which suggests that they are of comparatively recent development in that part of the East. Diligent collecting of their vernacular names is by no means unlikely to throw light on them; it is a more hopeful quest, indeed, than the seeking for the origins of races longer in cultivation. Westward these recurving long-tubered races have recently been traced as far as the Malay Peninsula: eastward into the Pacific they do not appear to go, at least not as far as Fiji, whence a fairly complete knowledge of yams has been obtained. There is nothing in the Malay name *ubi* *ular* common to Amboina and the Malay Peninsula which indicates the direction of their spreading: and the Philippine names are at present unexplained. From Malaysia, into India, races extend which curve in the soil, but not to the extent of

extruding; such races were figured in the Gardens Bulletin II, plate 3 of number 1. These also seem to be absent from the Pacific. Probably neither the short recurving races, nor the long recurving and extruding races are in Madagascar. Let that be proved, and fix the date of the Malayo-Polynesian invasions of Madagascar, also ascertain how far towards the East they go, and the dates of opportunities of going East, then it will be possible to demonstrate fairly clearly where these races were selected. At a guess one would say in Eastern Malaysia including therein the Philippine islands.

Origin of *D. opposita*.

D. opposita is so nearly related to the Japanese *D. japonica*, that a common origin is certain, and it may be that the former is derived from the latter; but there are curious races or varieties of these in the interior of China little known which are alternative parents. If an origin from *D. japonica* be favoured, its birth-place would be in or somewhere near Japan, and its extension southwards merely a parallel to that of several cultivated plants, which with a northern origin, have been induced to grow to order by Chinese selection in warmer parts than their homes. This on the whole seems most probable. It is also induced to grow further north than *D. japonica*.

It has relatively few races, and did not get brought out of the Far East until 1850.

The origin and adoption of *D. esculenta*.

The history of *D. esculenta* is rendered more obscure than that of *D. alata* by reason of no clear affinities being demonstrable: it is a species demanding almost the same conditions as *D. alata*, and it has been carried equally round the Tropics. But probably because the small tubers keep doubtfully, it has been little demanded either for provisioning boats, or replenishing the village stores. It has therefore travelled less. It has been demonstrated present on the continent of Asia, to Tahiti, and in the Seychelles and Mauritius: it is reported to be grown in Madagascar: it has been found to be the "Hausa potato" of the Guinea coast, and has been shown to be in the West Indies in an obscure way but in more than one race. Its more general distribution in the fields and gardens of the Monsoon area of Asia suggests that it originated in it: its presence in central Madagascar, if correctly reported, suggests that the Malayo-Polynesians transported it thither: its presence west of the Cape of Good Hope would be the work of the Portuguese. So that in many ways it has had the history of *D. alata*.

There is an interesting race of it in Luzon, reported not uncommonly as wild; but because it does not produce female flowers, and because the tubers are grown upon long stalks which carry them beyond the range of the protecting thorns in what would seem not to be an original feature of the species, it does not seem by any

means truly wild, but to be one of man's selections which finds itself able to persist alone for a time: and it does not demonstrate in the present state of our knowledge that Luzon is the home of the species.

Ancient cultivation is accompanied by a dissimilarity of the names used in different parts of a plant's distribution. Among the names belonging to *D. esculenta* none from the East has any resemblance to the word *mavondro* recorded as its in central Madagascar: in Behar and Tirhut it possesses the wholly unexplained name *suthni*: in western Burma it is one of the few species with a thi-name, in one part of Malaysia it is well known as *kombili*, in another as *sayuru*, *sayafu*, *siaffu*, etc., and in a third as *tugui*; and while the Tagalogs call it by this last name, the Ilocanos call it *boga* or *buga*. Fiji while possessing the name *kawai* for it, which name has the look of having come from the eastern edge of Asia, calls it also in the Nadroga language by the very dissimilar name of *sarau*. Such diversity does not help towards the tracing of the wanderings of the species in cultivation, but attests to the ancientness of it. The Aryans when they made acquaintance with *D. esculenta*, apparently called it *madvak*, a name distinctly appreciatory, and persisting to this day in *moala* etc., while more or less Aryan descendants have devised for it the parallel name *chinialu* or *sugar yam*.

Chinialu appears in the wrong form *chinaalu* or "Chinese yam" sometimes; and this latter is not to be taken as evidence of any wandering into Assam from China, but on the other hand it is possible that the race known as *javalla* in northern Ceylon, may have been (but in late days) brought thither from Malaysia. It does not prove that Ceylon had not the species from other sources and earlier.

Now-a-days, *D. esculenta* is more to the tribes of the Philippines and New Guinea than to most of the dwellers in the East; but it has a very great importance locally in Tirhut, where there stands in the fields crop after crop of a race which appears to be as much modified by man from the original plant, as are any races. It has however, lost ground greatly in Bengal, and appears likely to go out of cultivation, because the potato has entered its markets, as a supplement to sufficient rice.

Origins of *D. bulbifera*.

The letter *b*. on the map No. 10 indicates the places where *D. bulbifera* is known to be cultivated. The varieties or races in cultivation, more than one, are not greatly modified from the wild originals; a multiple origin of them is very probable, and assuredly a completely distinct origin is to be ascribed to the cultivated var. *latifolia* of West Africa and the New World. Rumpf when living in Amboina in the second half of the seventeenth century, recorded that cultivated *D. bulbifera* showed many variations; apparently he meant gradations towards the inferior wild plant, and he gave it no name other than that by which wild *D. bulbifera* was known.

It is possible that the early Portuguese took it up as a vegetable for ships' use in those days when anything that would arrest scurvy was like gold, its bulbils keeping particularly well, and the interesting name *ubi kastela* or Castile yam (that is either Spanish or Portuguese yam) found in Singapore island would arise therefrom. But caution is necessary for the sweet potato is *ubi katela*, *ubi ketela*, *ketela*, *katila*, *katela*, *kesela*, *kahitela*, *ima kastila*, etc. in eastern Malaya, and the name may have been transferred. If the portuguese used it, its occurrence in southern India could have come from them: and then if it can be found on the Guinea coast, as for instance in San Thome island, this supposition will be established. But the Guinea coast plant is *D. bulbifera*, var. *latifolia*, which we know was transported by the Portuguese across the Atlantic, and evidently used by them. That they used var. *latifolia* is, of course, a circumstance making recourse to the corresponding edible Asiatic varieties probable, although not proving it. Some years ago the authorities of the Penal Settlement at Port Blair in the Andaman islands, obtained from an unrecorded source a cultivated race of *D. bulbifera* under the name of Otaheiti potato. Every possible enquiry has been made regarding the origin of the name in the hope of therein discovering the origin of the race: but it can be traced from the Andaman islands to India and no further.

Origin of cultivated *D. pentaphylla*.

The letter p. on the map shows the few places where *D. pentaphylla* has been found in cultivation. In northern India it is grown in a variety named *hortorum*, and is a very rare vegetable of western Bengal and Assam. What seems to be the same has been found in the Myaungmya district of the Irrawaddy delta; and there a hybrid name *bela t myo uk* was given indicating that it had been brought recently from the direction of Bengal. In the south of India it is grown in a different variety, var. *Rheedei*, which, though rare, is found over a wide area. In the Malay Peninsula it is cultivated in the variety *malaica*, and in the Philippine islands in the variety *palmata*; there is also the variety *sacerdotalis* cultivated in Java, a race or variety in Amboina and also in Fiji. Surely these varieties have had separate origins.

D. pentaphylla is an extraordinary species in regard to its tubers, for it varies in them from a harmless and edible condition to one of considerable nausousness. There is in it therefore just what would give to primitive man the incentive to cultivation; and that would seem to be what has happened and is happening to-day. We see in it a species actually giving rise to cultivated races; but one which without doubt has been doing so fatuously through the centuries.

The varieties being little changed, in appearance, their names are descriptive only.

The place of yams.

Rumpf was probably right in placing yam-cultivation as the resort of tribes not able to raise sufficient rice for themselves, and having no sago to put into its place. He was writing of Malaysia: but his generalisation appears of wider application, and most particularly as it is seen that the wet rice-land of the wide plains is not really yam-country. Were the peoples who came to call even the races of *D. alata* by nouns, such as could not raise cereals enough for their requirements?

Of New World crops, potatoes and manioc, usually called among the oriental eaters of yams by whatever their common noun for yam may be, are the real rivals of the oriental species of *Dioscorea* for they appear exactly to fit the same niche. Did they in America come into man's service where the cereal crops (that would mean maize crops) failed to meet the population's needs? This appears probable. Both are species evolved by man,—cultigens—like *D. alata*. This then becomes an axiom, that the plains are for the cereals of the world: and man has been obliged to increase his reliance on starchy tubers in hilly regions. It may be considered not unreasonably, therefore, that hill-folk have had more to do with the creation of *D. alata*, and also with the modification of other Dioscoreas, than plains-folk.

List 1 in which *D. hispida* is recognised as of the same genus as *D. alata*.

baesi gudda in the Chanda district.
 bagh alu in Orissa.
 baiguni kand in the Mandla district.
 baijan kand in the Mirzapur district.
 bara kand in Baghelkand.
 bechandi kand in Chota Nagpur.
 bhui kand in Berar.
 bhaser kand in the Raipur district.
 gadong among the Bataks.
 ho koi in the Shan hills.
 huwi gadung in Java.
 huwi sawat in Java.
 jangli mataru in the Chanda district.
 kapu kayu in Celebes (but doubtful).
 khoai dian nan in Cochin-China.
 kolo kand in Chota Nagpur.
 mankat in the Shan Hills.
 nullasunna gudda in the Nizam's Dominions
 pe dumpa in the Vizagapatam district.
 phan lyngkhi in the Khasia Hills.
 phan solak in the Khasia Hills also.
 podavi kelengu on the Malabar coast (slightly doubtful).
 puti dumpa in the Vizagapatam district.
 saeva kand in the Betul district.

sunna gudda in the Nizam's Dominions.

tak-aru in the Chanda District (but doubtfully connected with aru which equals alu).

tella ginnigeddalu in the Ganjam district.

tella sunna gudda in the Nizam's Dominions, and as thella sunna gadda in the Chanda District.

ubi akas in Perak.

ubi arah among Sakais.

ubi gadis (probably correctly ubi gadong), among Bataks.

ubi gadung (rare) in the Malay Peninsula.

ubi sabut in Java.

undai kavalli in the Tanjore District.

uwi alis in Java.

uwi chayu in Celebes.

uwi dudung in Java.

uwi sawutjahe in Java.

uwitutung in Java.

vainu tega in the Vizagapatam District.

zaminkand in Kotah and Gwalior.

The localities of these names are not in or north of the Ganges plains; but are numerous in the northern part of the Peninsula immediately to the south of the Gangetic plains: the Khasia Hills alone represents Assam. the Shan Hills have one name; and in the Malaysian region there are several.

List 2 in which *D. pentaphylla* is admitted into the genus of *D. alata*; when proved nauseous an asterisk is prefixed.

* bajra kand in the Hoshangabad District.

* ban ratalu in the Betul District.

* bandri alu along the south of the Gangetic plain.

* bara kanda in the Bilaspur District.

* hayan alu in the Balasore District.

* bechandi kand in Chota Nagpur.

* belnikand in the Betul District

* bhaser kand in Bandelkhand.

* byang sanga (? rare) in Chota Nagpur

* chamar alu near Calcutta.

charka alu in the Midnapur district.

* chola sanga among the Hos in Balasore district.

chunchu gudda in the Nizam's Dominions.

* daigun alu in the Cuttack District.

* dakur kand widely in the Central Provinces of India.

dava karandi in the south-west of India.

dhan alu (doubtful name) in the Birbhum district.

* dukka pendalam in the Vizagapatam District.

- guti alu in the Sibsagar District.
 hasersanga in the Districts of Hazaribag and Singhbhum.
 hathia kand in the Shahabad District.
- * huwi chekker in Java.
 - huwi jahe in Java.
 - huwi sawat in Java and huwi sawat jahe.
 - kapu sayor in Celebes (probably not nauseous).
 - katawala in Ceylon.
 - katu kilangu in South India and katu nuren kilangu.
 - * koranie genassu in the Malabar District.
 - * kukur alu near Calcutta.
 - * kurudu gaddi in the Madras Presidency
 - man hing in the Shan Hills (perhaps not nauseous).
 - * mara keshango in Travancore.
 - mocha alu in the Mymensingh District.
 - mohan kand in the Akola District (but assuredly not nauseous).
 - mullu kilangu in Travancore.
 - nain'byen among the Kachins.
 - nuran kilangu and nurai genassu in places where Malayalam is spoken.
 - * odorahalu in the Balasore District.
 - * pandi mukha tega in the Vizagapatam District.
 - patha alu near Calcutta and south-westwards.
 - * pedra kanda in the Damoh District.
 - phan sujab in the Khasia language.
 - piralu under the Sikkim Himalaya.
 - * punda mohra gudda in the Chanda District.
 - * ribe alu in the Balasore District.
 - * ruine ng in the Mikir language.
 - * sher kand in the Bhandara District.
 - * sirka alu in the Midnapur District.
 - * suker alu near Calcutta.
 - * supnor kanda in the Raipur District.
 - * suralu widely in Bengal.
 - * sura alu and suri alu in Eastern and Western Hindi.
 - * surendi kand in the Bilaspur District.
 - * suta alu in the Angul District.
 - * tiva tega in the Vizagapatam District.
 - * ubi jabbet among the Sakais.
 - ubipasir in the Malay Peninsula and Java.
 - * ubisabut in Java.
 - * ubi taun-taun in Eastern Malaysia.
 - * vypa dumpa in the Godaveri District.

If the above list be compared with that given for *D. hispida*, it will be noticed immediately that *D. pentaphylla* is not infrequently admitted to be an alu where *D. hispida* is not. The localities for the inclusion of it within the genus alu are in the lower part of the Ganges plains, in the Gangetic Delta where the languages are

Eastern and Western Hindi and Bengali, in Assam where the kindred language Assamese is spoken, and to the south of the Gauges down into Orissa and in the Central Provinces of India. Many of the names are connected with the sanskritic root of the verb "to hurt" and their great abundance and wide spread indicate in a remarkable manner that some name or group of names out of which they have come, have long been current. *D. pentaphylla* is also in one name admitted as a s a n g a or s a n g which word the Kols and Santals otherwise restrict to good edible yams; but there is some possibility that the usage is not well founded: it is also a p e n d a l a m in one name and a r a t a l u in another.

List 3 in which *D. bulbifera* is admitted as of the same genus as *D. alata*.

a d i v i k o n d d u m p a l u in the Vizagapatam District.
 a n a t h i k a n d in Chota Nagpur and the Monghyr District.
 b a b r a k a n d in the Amraoti District.
 b a r a k a n d a in the Central Provinces of India.
 b a u l a a l u in the Balasore District
 b i h i k a n d in the Raipur District
 b o l a r k a n d in the Amraoti District
 b o t l a k a n d a in the Raipur District.
 b u n a a l u in the Districts of Dinajpur and Bogra.
 c h a i n k a n d in the Central Provinces of India.
 c h e d a r u k a n d in the Akola District.
 c h e d u d u m p a in the Vizagapatam District
 d a n g k a n d a in the Raipur District.
 d o d d a k u r u d u from some parts of the Madras Presidency.
 d u k u r k a n d in the Betul District.
 g a i c h a a l u in eastern Bengal.
 g a t h a l u among Marathas.
 g a t h o u r k a n d in the Narsinghpur State.
 g h a r i a l u in the District of Sangor.
 g i t o r a k a n d a in the Bilaspur and Mandla Districts.
 h a t h i a k a n d in the Shahabad District.
 h r a t o w in the Chin language.
 h e r i p u t i h in Amboina (but the use of the adjective "white" suggests that it is the cultivated plant).
 h i w u w a r a in Eastern Malaysia.
 h o k h o in the Shan language.
 h u w i u p a s in the Sundanese language.
 j a n g l i a l u in several districts of Bengal.
 j a n g l i g a t h a l u in the Raipur District.
 j a n g l i m a t a r u in the Bhandara District.
 j b u m a l u in the Chittagong District
 k a l g e n a s u in the Malabar District.
 k a l a k a n d in Nimar and in adjoining Districts.
 k a r u k a n d a widely in the Central Provinces and in Central India.
 k a t u k a c c h e l in south-west India.

katukilangu in south India.
 kauhaia kand in the Balaghat District.
 kaya pendalam in the Circars.
 ke-i-mo in Japan (but probably edible *D. bulbifera*).
 keai kand in the Chindwara District.
 kedro kand in the Surat District.
 koppa kavalli in the Tanjore District.
 kukur alu near Calcutta.
 kukur torul in Nepal.
 kunti genasi in Kanara.
 kurukand in the Nasik District.
 manokand in the Surat District.
 matawar kand in the Balaghat District
 muka keshango and muka kacchhal in Travancore.
 nai kalu among the Kachins.
 nulla giunni geddalu in the Ganjam District
 nulla godda in the Chanda District.
 owi behas among the Dyaks of south Borneo.
 pagla alu in the Chittagong District.
 paicha alu in the Mymensingh District.
 ?panukonda in southern Ceylon.
 patti kacchhal in Travancore.
 phan kthang in the Khasia language.
 phan lakhar in the Khasia language.
 phan lyngkhi in the Khasia language.
 phan pylleng in the Khasia language.
 pitkanda in the Raipur District.
 radraksha pendalam in the Circars.
 raht alu in Chittagong.
 ribsonikand in the Jhansi District
 satik kavalli in the Tanjore District
 sharbutra kanda in the Raipur District.
 sim shu in Formosa.
 sisi dumpa in the Vizagapatam District.
 suker alu near Calcutta.
 suralu widely in Bengal.
 thuli kacchhal in Malabar and Travancore.
 ubi da-are in Halmahera, eastern Malaysia.
 ubi ipit in Bali.
 ubi kule in eastern Malaysia.
 ubi kumili utan in the Malay Peninsula.
 ubi ondo in Celebes.
 ubi puteh in the Malay Peninsula.
 un-kau-tsu, a Chinese name.
 uwi upas in Java.
 vara kilangu in Travancore.
 vennikilangu in the Malabar District.

Just as *D. pentaphylla* so is *D. bulbifera* considered an alu, and in two names it is admitted as a pendalam. It is quite widely and naturally a kand and a kilangu.

The List of Names.

Abau, Abobo, Abubo, Abubu; Ahuhu, Ohuhu, Ahua, Ahoea, used in the eastern Malay islands for *D. bulbifera* and for *D. pentaphylla*, and the first also possibly for *D. hispida*. Abau is used in Solor; Abobo and Abubu in Ternate (Kamel); Abubo in Celebes (Rumpf).

Adabgai, a Savara name for nauseous *D. pentaphylla*, Circars.

Addar in the Vizagapatam district, Circars, for nauseous *D. pentaphylla*; probably from Adabgai.

Adivi = wild in Telegu.

Adivi chara dumpa = wild *D. alata* in the Godaveri district.

Adivi genusu gadda = wild sweet yam, edible *D. pentaphylla* in the Cuddapah district.

Adivi genesu alla = wild sweet yam, the same in North Arcot.

Adivi konda dumpalu, either *D. bulbifera* or *D. hispida* in the Vizagapatam district.

Aelan or Elan, for yam in south Ceram.

Agitha or Angitha, common forms of Genth (q.v.) in Western Hindi and not unknown in Eastern Hindi.

Aharu alu, a tautologic form of Ratalu from the Dinajpur district, Bengal, for *D. alata*.

Ahei or Ahey (Rumpf), for *D. pentaphylla* in Amboina; and as **Iae** (Rumpf), in Lochon.

Ahua, Ahuo, or Ahuhu, used in Ceram and in Haruku which is near Amboina. See Abau. Rumpf used the second word.

Ait alu = ? bunched yam, for a race of *D. alata* in the Sylhet District of Assam.

Akar = climber, in Malay, and also root. It and the next as regards Dioscoreas, are applied to species whose deep-buried tubers are unfamiliar, not being sought for food.

Akar bunga kamayan = benzoin flower creeper, for *D. pyrifolia* at Priaman in Sumatra.

Akar bunga keminiyan = benzoin flower creeper, is *D. pyrifolia* in South Sumatra or *D. laurifolia* in Malacca and Negri Sembilan.

Akar guluno (Alvins), probably meant for akar gulung or twining creeper, from Negri Sembilan, for *D. pyrifolia*.

Akar jangot kulonak = bearded (?) Smilax creeper, for *D. pyrifolia* or *D. orbiculata* in Negri Sembilan. The legitimacy of translating kulonak by Smilax may be questioned, but no alternative seems better.

Akar kakop (Alvins), from Malacca for *D. orbiculata*.

Akar kamahang (Alvins) = benzoin creeper for *D. pyrifolia* or *D. laurifolia* in Malacca.

Akar kamiyan, akar kamoyan, akar kamayan, and **akar kumoyan**, for *D. pyrifolia* in Menangkabau Sumatra.

- Akar kelona** or **akar klana** = Smilax creeper, for *Dioscoreas* not used as food, in Malacca and in Negri Sembilan.
- Akar keminiyan paya** = marsh benzoin creeper, the same.
- Akar keminiyan hantu** = ghost's benzoin creeper, the same both in Malacca and Priaman, Sumatra.
- Akar kowat**, for *D. Havilandii* in Sarawak.
- Akar kumili** = Kombili creeper, for *D. bulbifera* in Malacca or Negri Sembilan.
- Akar manujan** or **akar mamujan** (Alvins), doubtless a variant of *akar keminiyan*.
- Akar mawas** (Alvins) = the Mia's or Orang-utan's creeper, for *D. pyrifolia* in Malacca.
- Akar prung** = ? clearing yam, for *D. pyrifolia* in Palinauan.
- Akar seruting** (Alvins) = Seruting (a Javanese dish) creeper, for *D. laurifolia* in Malacca.
- Akar ubi pasir** = sand yam creeper, for *D. Scortechinii* in Perak. The Javanese use of Ubi pasir is very similar.
- Akash kanda** = heavenly yam, a race of *D. alata* in Raipur, Central Provinces of India.
- Ala-ala** in the Hawaiian islands for the bulbils of *D. bulbifera*.
- Ala-koro**, a Fijian race of *D. alata*.
- Ala-pa** in the Shortlands island, Solomon group, for *D. bulbifera*.
- Alea** (Rumpf) for fingered *D. alata* in Malay.
- Alshi**, see **Ulshi**.
- Altapatti alu** or **Alta alu** = heema yam, a race of *D. alata* in the Murshedabad district, Bengal.
- Alu** (hindustani) from **Alucha** (sanskrit) = yam. Probably the Aryan invaders who introduced the sanskritic languages into India brought this name with them, but they came from a region where edible *Dioscoreas* would have been unknown. Alua and Alora are used for Alu in the Sontal Pergunnahs, and Alu kanda is a tautologic form found in the Raipur district of the Central Provinces.
- Aman** for *D. anguina* in Alirajpur, W. India.
- Amdalata**, for *D. bulbifera* in Chittagong.
- Ampu** for *D. transversa* in Queensland (Bailey).
- Anathi kand**, a corruption of Angethi used for *D. bulbifera* in Chota Nagpur and the adjoining Monghyr district.
- An** = prefixed to the names of several *Dioscoreas* in the Saka'ava and Hova languages, Madagascar.
- Angaroka** for edible *D. orinala*, in Sakalava.
- Angetrika** for a *Dioscorea* in Hova.
- Angona** for *D. fimbriata* in Madagascar.
- Antakara** for the same.
- Antaly**, for *D. Antaly* and *D. sp.* in Sakalava and Hova.
- Anayod**, a race of *D. alata* in the Philippine islands.
- Anda**, **Andi** or **Andi kand** = ? tuber yam, for *D. oppositifolia* in the districts of Nimar and Amraoti, Central Provinces of India, and also reported as *D. esculenta* in Nimar.
- Andut kacchel**, for cultivated *D. bulbifera* in Travancore.

Aneg, an Ibanag name for *D. esculenta*.

Ane genasu, for a race of *D. alata* in Canara, W. India.

Angethi, equivalent in Western Hindi and Behari to Genth.

Angilir alla, or **angilis alla**, for a race of *D. alata* in Ceylon.

Ankul, for edible *D. pentaphylla* in the Belgaum district, W. India.

Anyorbil, for *D. bulbifera* in Queensland, on the Palmer river.

Aoui (awi), a perfumed yam (? race of *D. alata*) in N. Caledonia in the Voi and Aiti languages.

Appa guddi, a wild yam in Berar.

Ar, Aru or **Arua**, equivalent to alu in some Indian districts where Eastern Hindi, Western Hindi and Behari are the prevailing languages; and when unqualified indicating *D. alata*.

Aribubu, for *D. luzonensis* in the Ilocano language, but appearing to be the same word as the next.

Aribukbuk, an Ilocano name for *D. bulbifera*.

Aritega, avitega or **avitenga tega**, names for *D. oppositifolia* or for *D. tomentosa* in the Vizagapatam district, Circars.

Aroi = creeper in Javanese, like akar.

Aroi chanur mentzek = Smilax creeper, probably for *D. pyrifolia*.

Aroi gadong, for *D. hispida* on the Salak, Java (Blume).

Aroi huwi churuk, snout yam creeper, for *D. myriantha* and perhaps other species.

Aroi seselan, for *D. gedensis* in Java.

Arvi, in Hyderabad, Deccan, apparently the same as the next.

Arwa, for arua, in the Ballia and Gorakhpur districts of the Gangetic plains.

Asiahu, indicates yam, in South Ceram; cf. Abau.

Atar, for Ratalu, q.v., in south-west Behar, Gangetic plains.

Athi kilangu or **athi kanni** = early yam, for *D. oppositifolia* and *D. spicata* in Travancore.

Ato sang (Watt), as a Santali name, doubtless for haser sang, q.v.

Attu kavalai, for *D. bulbifera* or *D. alata* in the Tanjore district, Madras.

Avatenga tega, see Aritega.

Ayan = yam, on the north coast of East N. Guinea, the same as En.

Ayer, for yam, on the Kei islands.

Aylan, for yam, in South Ceram.

Aylohun ubi, given by Rumpf as a name for *D. nummularia* in Amboina.

Ay-panan, for *D. grata* in Luzon. Cf. Ayan and Aywel.

Aywel or **Ywel**, for *D. pentaphylla* in Amboina.

Babo, general in Madagascar for yam (Heckel).

Babra kand = acacia yam, for *D. bulbifera* in the Amraoti district, Berar, doubtless now on account of the fragrance of its flowers: but there is a possible origin from Bamla and also from Bara kanda.

Bada kanda = see Bara kanda.

Baesi gudda, for *D. hispida* in the Chanda district, Central Provinces of India.

Bagai, for *D. hispida* in Mangyane.

Bagh alu or **baghra alu** = tiger's yam, for *D. hispida* through Orissa.

Bagh hata alu = tiger paw yam, used in the district of Mymensingh, for *D. esculenta*.

Bagh thapa alu = tiger-claw yam, for *D. esculenta* in the districts of Purneah, Dinajpur and Jalpaiguri, Bengal.

Bahmuria alu, a race of *D. alata* in the Brahmaputra Valley.

Bai or **Bai kay**, Chin or Shandu words indicating some *Dioscorea* probably *D. hispida*. Kay suggests Khoai, and the Burmese Kywe, which is pronounced as 'hwey.

Bai alu = ? deep going yam, or more likely connected with the last, for *D. anguina* in the district of Sylhet, Assam.

Baiguni kand, for *D. hispida* in the district of Mandla, Central provinces of India, Cf. Bail.

Baijan kanda, for *D. hispida* in the district of Mirzapur, Ganges valley. It would seem to be a distortion of Byang sang; see Boiang.

Bail, Bayal, Beliya, Bai-ili, common Korku words for *D. bulbifera* and sometimes for *D. oppositifolia* or *D. aculeata*. Men who are not Korkus, but live in contact with them, affix "kand" doubtless wrongly. The last two and the next two names and Baesi gudda may be connected. The Chin Bai is strikingly similar.

Bajar, for *D. hispida* in the Kotah state, W. India.

Bajra kand, for nauscaous *D. pentaphylla* in the Hoshangabad district, Central Provinces of India.

Bakoi, see Bekoi.

Bakuta, for *D. pentaphylla* in the Hanuabada language of Papua.

Balebale, recorded by Hazlewood as a Fijian name for (? a race of) *D. alata*, but apparently an error.

Baliala (N. N. Banerjee), as a tuber eaten in Cuttack, seems to be derived from Bail.

Balikag, for *D. luzonensis* or for *D. dirivicata* in the Visayan language, Luzon.

Ballolong, a race of upgrowing *D. alata* in Luzon.

Bamla, Bamli or **Bawla**, for *D. bulbifera* in the districts of Birbhum and Midnapur, Bengal, which may mean "clustered," but is probably of Munda origin, see Bolai kanda.

Ban = wild in Hindi and kindred languages.

Ban alu for *D. bulbifera* in Bengal.

Ban aru = wild yam, used for several, if not all, wild yams in Chota Nagpur and the Sontal Pergunnahs.

Ban babla = wild acacia, for *D. bulbifera* in the Bankura district of Bengal, possibly on account of the scent of its flowers, but probably Babla = Bamla.

Ban gethi = wild genth, for wild *D. bulbifera* in the N.-W. Himalaya, where this species is also cultivated.

- Ban ratalu** = wild ratalu, for nauseous *D. pentaphylla* in the Betul district, Central Provinces of India.
- Ban tarur** = wild tarur, for edible *D. pentaphylla* and for *D. belophylla* in the Almora and Naini Tal districts of the N.-W. Himalaya.
- Ban torul** = wild torul, in Sikkim and adjoining Nepal for wild *D. alata*, *D. belophylla* and probably other (? edible) species.
- Banagan** (Usteri), for *D. bulbifera* in the island of Negros, Philippine Islands. See Baong.
- Banaghor**, for a flat race of *D. alata* in the district of Jessore, Bengal.
- Banan**, for *D. nummularia* in Bagobe, Mindanao. Cf. Banagan.
- Banar**, for *D. zollingeriana* in Palembang, Sumatra. Can it be an error for Chanar?
- Bandri alu** or **Bandoreh alu** = monkey's yam, for nauseous *D. pentaphylla* in the Ganges plains from the districts of Monghyr and Baghalpur for some distance westward, and for *D. bulbifera* in Bengal.
- Bango**, said to be used for *D. anguinu* in the Midnapur district, Bengal.
- Bank**, for *D. hispida* in the Gorakhpur district, Gangetic plains.
- Baong**, **Bayangkan**, **Banagan**, **Bohayan**, Visayan names for *D. bulbifera*, whence Bayag cabayo has been derived. Bayangkan may also be misapplied to *D. pentaphylla*.
- Bara alu** = big yam, for a race of *D. alata* in Sylhet.
- Bara kanda**, **Barai kand**, **Barahi kand**, **Bada kanda** = hog's yam, for several wild Dioscoreas in the Western Hindi language, e.g. for *D. belophylla* in the Damoh and Jabalpur districts and in Baghelkhand, *D. hispida* and *D. bulbifera* in the Jhansi district and for nauseous *D. pentaphylla* widely in the Central Provinces.
- Bargo nari**, said to be *D. bulbifera* in the Maunbhum district.
- Barha kand**, see Bara kanda.
- Barlang**, for *D. hispida* in the Darjeeling district.
- Barmuria**, for *D. pentaphylla* in the Brahmaputra valley, cf. Bahmuria alu.
- Barogai**, a Savara name for *D. tomentosa*, Circars.
- Barsal kanda**, for *D. belophylla* in the Nimar district, Central Provinces of India.
- Batharpatia alu** or **Bothapotia alu** = flat oar yam, a race of *D. alata* in the Darrang district, Assam.
- Bathraj**, for *D. bulbifera* in the Roza district, Bengal.
- Bati**, a Fijian race of *D. alata*, probably for Botia.
- Baula alu**, for *D. bulbifera* in the Balasore district, Bengal, the same word as Bamla.
- Bayag cabayo** = horse's testicles, for *D. bulbifera* in Luzon indicating the bulbils, but obviously a distorted recent name cf. Baong.
- Bayan alu**, for nauseous *D. pentaphylla* in the Balasore district, Bengal.

Bayangkan, see Baong.

Bayuni alu, an undetermined *Dioscorea* in the Murshedabad district, Bengal.

Bechandi kand = the tuber which yields bechandi. Bechandi is a coarse meal prepared from *D. hispida*, and perhaps also from *D. pentaphylla*, which a certain section of Hindus in Chota Nagpur, and adjacent parts of the Central Provinces and Bengal, permit themselves to eat on fast days, that is to say, they allow themselves the food of the poorest. Thus Bechandi kand means *D. hispida*. The origin of the word is not clear, but Bail is suggested in the first syllable.

Begur, for edible *D. pentaphylla* in Eastern Nepal and in Sikkim in the Paharia language.

Bekoi, Bakoi, Bekoya = yam, among the N. Sakais of the Pahang-Kelantan border, or tautologically as ubi bekoi in N. Pahang. Bakhoi chyung and bakhoi logn are words collected from Besis in Malacca, the application uncertain. Bekoi suggests the Mon word Khoi, and almost certainly "be" stands for ubi.

Bakuta, for *D. pentaphylla* or an allied species, in the Hanuabada language of Papua.

Belat myouk u = foreign yam, for cultivated *D. pentaphylla* in the Myaungmya district of Lower Burma, a hybrid name from Hindustani and Burmese.

Belni kand, either nauseous *D. pentaphylla* or *D. oppositifolia* in the Betul district, Central Provinces of India. Probably the same as Beliya kand. see Bail.

Belog, stated to be a yam among the Senoi of ? upper Pahang, though perhaps indicating the tapioca plant, cf. under Bekoi, the name Bakhoi logn.

Bemandry, for edible *Dioscorea Bemandry*, edible *D. Sosu* and *D. trichopoda* among the Sakalava in Madagascar (Heckel).

Benai alu or **Benia alu**, a race of *D. alata* in the Murshedabad district, Bengal, possibly from the yam suggesting a lock of hair: cf. Kaisali.

Beng-chapa alu = frog's skin yam, for *D. esculenta*, used along with Bagh-thapa alu in the same districts and in the same way.

Bengo alu, an edible yam of Lohardaga, Chota Nagpur.

Benkei-imu, for cultivated *D. bulbifera* in Japan.

Berar, a Shandu word for yam, Arakan (Gwynne Hughes), possibly for Bai-hra.

Betule, for *D. hispida* in Celebes (Rumpf). In Ternate Bete is *Colocasia*.

Betzy or **Bitzy**, as Chinese names for *D. esculenta* (Rumpf); they appear distortions ending with tsu which means tuber.

Bhag torul = tiger's yam, for *D. glabra* in eastern Nepal and Sikkim.

Bhains dethi = buffalo's teeth, a race of *D. alata* in the Raipur district of the Central Provinces of India, but also for *D. anguina* in the Raipur and Balaghat districts.

Bhas alu, for *D. bulbifera* in the Chittagong district.

Bhaser kand, for nauseous *D. pentaphylla* in Bandelkhand, or for the still more nauseous *D. hispida* in the Raipur district. See Bhusa.

Bhat alu or **Bhata alu** = boiled rice yam, for *D. glabra* in the districts of Malda, Bengal, and Nowgong, Assam. The Malay name Ubi nasi contains the same idea of colour.

Bhiya gond, for *D. alata* from the Purneah district. Gond is probably a distortion of Kand.

Bhui kand, for *D. hispida* in Berar, India.

Bhuiya alu, for *D. alata* in the neighbourhood of Calcutta.

Bhumia mati, for *D. oppositifolia* in the district of Betul, Central Provinces of India.

Bhusa or **Bursa**, for nauseous *D. pentaphylla* in the southern dialects of Eastern Hindi.

Bhusara, a race of *D. alata* grown in the Surat District, Bombay.

Biau, for *D. esculenta* in the island of Bali.

Bigap or **Bigop**, used by Sakais in Perak, and as **Gap** by Orang Tanjong at Kuala Langat, Selangor, possibly for yam: the Malay word Ubi may be in it, the first syllable having been dropped in the same way, as Sakai cut down Ubi benggala into ngala. The sound is in Bekoi and Belog, q.v.

Bihang = yam, among the Belanda of Kuala Langat, Selangor (Blagden).

Bihaun, for *D. esculenta* in Bali.

Bihi kand, for *D. bulbifera* in the districts of Raipur and Damoh, Central Provinces of India, and perhaps the same as Bhui kand.

Bil, an abbreviation of Kombili for *D. esculenta* in the Madioen Residency, Java.

Billa tega, for *D. glabra* in the Ganjam district, Circars.

Binang, a race of *D. alata* in the Philippine islands.

Bininag, a race of *D. alata* in Luzon.

Binnar alla or **Bindhar alla** = September yam, a race of *D. alata* in Ceylon.

Binna jhar alu = several tulers yam, a race of *D. alata* in the Jessore and Bakarganj districts of Bengal.

Binurag, a race of *D. alata* in the Philippine islands.

Bir sanga or **Biru sanga**, a Santali and Kol name for several edible yams, e.g. *D. esculenta*, *D. glabra* and *D. Hamiltonii*.

Bis = yam at Singhi, Sarawak (Moulton).

Bitule, for *D. hispida* in Menado, Celebes.

Blant-kayu, for yam at Bugan, Sarawak (Moulton).

Bodot, **Borot** or **Bolot**, a Visayan name for *D. esculenta*, Luzon.

Boga or **Buga**, an Ilocano name for *D. esculenta*.

Boga alu, for *D. Hamiltonii* at Tezpur, Assam.

- Bohayan**, a Visayan name for a *Dioscorea*, Luzon; see Baong.
- Boiang, Boiom, Byam or Byang sanga**, the common name among the Kols and Santals for nauseous *D. pentaphylla*, and once met with applied to cultivated *D. pentaphylla* in the district of Murshedabad, Bengal.
- Bok**, in the Lepcha language indicates *D. alata* and the closely allied *D. Hamiltonii*; but is also met with in Sikkim with an adjective for other *Dioscoreas*:—see Buka bok, Chimeotendeo bok, Kacheo bok, Kachma bok, Kancheong bok, Lann bok, Meeha bok, Mujib bok, Padum bok, Palam bok, Pamir bok, Panu bok, Pari bok, Pasok bok, Pazien bok, Pem bok, Phaleo bok, Puri bok, Shimo bok, Siddhiu bok, Singul bok, Sizu bok, Soum bok, and Sung bok.
- Bok dung**, a race of *D. alata*.
- Bok dung kap** = little bok dung, a race of *D. alata*.
- Bok hyrh** = red yam, a race of *D. alata*.
- Bok kap** = little yam, a race of *D. alata*.
- Bok up**, a race of *D. alata*.
- Bok yung** = excellent yam, for *D. Hamiltonii*.
- Boka**, for *D. alata* in Fiji by misapplication from Colocasia and probably quite erroneously used.
- Boku**, in the Manuabada language of Papua, a yam near *D. nummularia*.
- Bolar**, in Korku, and **Bolar kand**, as a hybrid with Hindi, for *D. bulbifera* and *D. oppositifolia*, chiefly the latter, in the Amraoti district of Berar.
- Bolwai gadda**, for *D. hispida* in the Madras presidency.
- Bonderi alla**, for a race of *D. alata* in Ceylon.
- Bon alu** = ban alu or wild yam in parts of Bengal.
- Boounden**, a yam of N. Caledonia in the Voi language.
- Boroniliga**, a race of *D. alata* in Fiji (Wright).
- Boti**, for *D. hispida* in Roti island.
- Botia**, a race of *D. alata* in Fiji (Wright).
- Botla kanda**, for *D. bulbifera* in the Raipur district of the Central Provinces of India. (cf. Bolar kand).
- Bouaou**, a yam of N. Caledonia in the Voi and Ati languages.
- Boutanhenn**, a yam of N. Caledonia in the Voi language, the same as Kutanhann, q.v.
- Braron**, a yam of N. Caledonia in the Ati language, the same as Founambouat.
- Bu, Buar or Buko** = yam, respectively at Kajan Rijang, Tabun and Matu, Sarawak (Moulton).
- Buga**, a race of *D. esculenta* in Luzon, see Boga.
- Buka bok**, a Lepcha name for a *Dioscorea*, Sikkim.
- Budh**, for *D. hispida* in the Thana district, Bombay.
- Bukaw**, used for yam in Melano (Tamat).
- Bulo**, for *D. pentaphylla* in Fiji (Wright).
- Buloi**, a Tagalog name for *D. divaricata*.
- Bulu or Butu**, for yam in Java and several islands of the Malay Archipelago. See Butu.

Buna alu, for *D. bulbifera* in the Dinajpur and Bogra districts of Bengal.

Bunga meraya, for *D. hispida* in Menado, Celebes.

Burdi gaddi, a Telegu name similar to the Savara Birogai or hog'-yam, for *D. tomentosa* in the district of Cuddapah, Madras.

Buru aru, for *D. belophylla* in the districts of Ranchi and Singhbhum. Cf. Bir-sanga.

Buti, a race of *D. alata* in Fiji, probably for Botia.

Buti gal, a Savara name for *D. bulbifera* in the Ganjam district, Madras.

Butu, also **Bulu**, a common Javanese name for *D. alata* more frequently as Huwi buton, and if Malay is the language as Ub, butung; or huwi butu in Savu and Lame butung in Makassar; not uncommonly as Dudung, and sometimes as Huwi dudung or Huwi tutung. It is suspected that Ubi bulong is but a mistake for the second one of these. Kombili bulu in the Moluccas suggests it too. Though commonly associated with the vulgar word *butoh*, a more obscure origin is suggested by its variability. It seems quite possible that the word is not Javanese, nor Sundanese nor of the other languages which use it, but has been incorporated from some undetected source, and thence the many variations.

It is worth remark that where these names are used, *bulu* is not the name used to indicate a bamboo, as it is in Sumatra, the Malay Peninsula, Bali and parts of Celebes.

Caboui, see **Kabui**.

Cabuvo or **Casuvo**, see **Kabuvo**.

Caironi, see **Kaironi**.

Camangiy, see **Kamangiy**.

Camarire, see **Kamarire**.

Carando (Rheede), used for *Karandas*, q.v.

Cambare-Maron, in Mauritius for *D. bulbifera*.

Carot, see **Kalut**.

Cathia, see **Kathia**.

Cayos, see **Kayos**.

Chai, Chain, Chayen, Chain kand, Chani, Chatai or **Chatan kand**, a series of names used from the district of Moughyr, Bengal, on the east, to the district of Thana, Bombay, on the west, usually for *D. hispida*, but sometimes for other species, e.g. *D. pentaphylla* in Thana, *D. bulbifera* in Kotah and Hoshangabad, or *D. anguina* in Bhopal.

Chaina, a not uncommon name for *D. alata* along the Bombay coast becoming China and Chini northwards in Baroda. Unqualified in the State of Sawantwadi China is a race of *D. alata* with a short flat tuber, and magenta skin.

Chako pindi, for *D. tomentosa* in Travancore.

Chakun, a Cachari name for *D. glabra*. Cf. Khakun and Thakun.

Chakya machalu, a race of *D. alata* in the Sontal Pergunnahs.

Chalia kham alu = kham alu with a thick skin, a race of *D. alata* in the Midnapur district, Bengal.

Chalu valli kilangu, for *D. tomentosa* in Travancore.

Chamar alu = flesher's yam, for nauseous *D. pentaphylla* near Calcutta.

Chanar (or in dutch spelling tjanar), means in western Java similar and certain rather similar Dioscoreas.

Chanar babi = pig's Smilax, for *D. polyclades* or *D. deflexa*.

Chanar bulan or moon Smilax, for *D. pubera* in west Java.

Chanar potyung, for *D. pyrifolia* in Sundanese.

Chanar semut = ant's Smilax, for *D. pyrifolia*.

Chan yu = hill or jungle colocasia, and ('han yao, hill or jungle medicine; see Shan yu and Shan yao.

Chanwari aru, for *D. belophylla* in the district of Ranchi, Chota Nagpur.

Chapti ratalu = flat ratalu, a race of *D. alata* in Rai Barcilly, Gangetic Plains.

Charka alu, for *D. pentaphylla* in the district of Midnapur, Bengal.

Charkarkhuta alu = spinning wheel post yam, a race of *D. alata* in Sylhet, Assam.

Charodi, for *D. pentaphylla* in the Baygyat language, Andaman islands.

Charon chaval, for *D. tomentosa* in Travancore. See Chaval.

Chataveli (Marathi), for Shendwel, q.v.

Chaval, Chavalli or **Chavala kilangu**, for *D. aculeata* or *D. pentaphylla* in Travancore and the Malabar district.

Chechari, for *D. belophylla* in the district of Ranchi, Chota Nagpur.

Chedari kand, for *D. bulbifera* in the Akola district, Berar.

Chedu dumpa or **Chedu haddu dumpa** = bitter yam or bitter climbing yam, for *D. bulbifera* in the Vizagapatam district, 'ircars.

Cheilpani kanda, a race of *D. alata* in the district of Raipur, Central Provinces of India.

Chemna alu, for *D. glabra* in the Birbhum district, Bengal.

Chena gaddi, apparently for *D. bulbifera*, in southern Berar.

Chenchu gadda, a race of *D. alata* in the district of Kurnul, Madras.

Chengka, for *D. esculenta* in Buginese.

Cheni aru, for *D. glabra* in the Sontal Pergunnahs.

Chenyel, for *D. tomentosa* (Dymock) intended for Shendwel, q.v.

Cheranga or **Cherango**, for *D. aculeata* in the districts of Puri, Orissa, and Ganjam, 'ircars, becoming 'heranga kanda in the district of Raipur, Central Provinces of India.

Cheru kilangu = small yam, for *D. esculenta* in the district of Malabar, W. India.

Chhilpen kanda, a race of *D. alata* in the Raipur district, India.

Chien shan yao, see Shan yao.

Chili alu, a race of *D. alata* in the district of Angul.

Chimeo tendeo bok, for *D. glabra* or *D. lepecharum* in Sikkim.

Chinga alu, for a race of *D. alata* in the Chittagong district.

Chini, see **Chaina**.

China alu and **Chini alu** = Chinese yam or sugar yam, a race of *D. esculenta* in the Brahmaputra valley, and also similarly used in the Balasore district, Bengal.

Chola sanga, for nauseous *D. pentaphylla* among the Kols in the Balasore district and westwards.

C'houn, a yam of N. Caledonia in the Voi language.

Chubri alu or **Chupri alu** = basket yam, a race of *D. alata* about Calcutta and westwards.

Chuli jhinka alu = club shaped yam, a race of *D. alata* from Cuttack, Orissa.

Chulia kham alu = ? Tamil post-yam, for a race of *D. alata* in Orissa.

Chun alu = lime yam, a Khediya name for *D. Hamiltonii* in the Mayurbhanj state, Orissa.

Chunchu gudda, for a Dioscorea possibly *D. pentaphylla*, in the Warangal district of the Nizam's Dominions, largely eaten by Gonds.

Chunchuni kand, for edible *D. pentaphylla* in the Balaghat district of the Central Provinces of India.

Chunghat alu = lime-pot yam, a race of *D. alata* in the Sylhet district, Assam.

Chwey (phonetic), for **Kywe**.

Cobag and **Cobag na quiroy** (Blanco), see **Kobag**.

Cocathi, see **Kokathi**.

Colot, **Corot** or **Calut**, see **Kalut**.

Combili, see **Kombili**.

Connette (Rheede), for edible *D. pentaphylla* in S. W. India, apparently from Kanda, as are Kon, Konda, etc.

Coubar or **Coupar**, see **Kubar**.

Coumandioh, see **Kumandioh**.

Coutanham, see **Kutanham**.

Cu = yam, in Tonkin, = Khoai.

Cu-cai, a cultivated race of *D. alata* in Tonkin.

Cu-cai-mo, for Khoai mo, a race of *D. alata* in Tonkin.

Cu-coc-gian, for a race of *D. alata* in Tonkin.

Cu-mai, for Khoai mai in Tonkin, a race of *D. persimilis*.

Cu-nao, and **Cu-nao-do**, for *D. cirrhosa* in Tonkin.

Cu-o-giong = dragons nest yam, for *D. cirrhosa* in Tonkin.

Cu-tu, and **Cu-tu trang**, for *D. esculenta* in Tonkin.

Dadakan, a name for *D. bulbifera* in Bagobo, Mindanao.

Daga, **Dago** or **Dagu** = yam, among the Marianne islands, perhaps particularly *D. alata*.

Dagu aniti (Gaudichaud), inedible.

Dagu apaka, for *D. esculenta*.

Dagu apleyang (Gaudichaud).

Dagu cochon (Gaudichaud).

Dagu fanighi (Gaudichaud).

Dagu hago, a race of *D. alata* in Guam.

Dagu kwezlytail and **Dagu quegleytale**, (Gaudichaud).

Dagu maissa houlon, (Gaudichaud).

Dagu manbila, (Gaudichaud).

Dagu manila, (Gaudichaud).

Dahambou, a yam of N. Caledonia in the Voi language.

Daigun alu, for nauseous *D. pentaphylla* = Baiguni, q.v.

Daikoro imo = stumpy yam, a race of *D. opposita*, in Japan.

Dai peri, a Queensland name for *D. bulbifera* on the Batavia river.

Daijo = big jo, said to be for *D. alata* in Japan.

Dakulevu, a race of *D. alata* in Fiji (Wright).

Dakur kand, **Dukar kand**, or **Dukel kand** = pig's yam, for nauseous *D. pentaphylla* in the Bhandara and Chanda districts of the Central Provinces of India.

Dam = for certain yams in Cambodia.

Dam-long-chevra cham, for a race of *D. alata*, the same as Khoai mo.

Dam long phluk, for *D. cirrhosa*, according to one authority, but according to another, and probably correctly for a race of *D. alata*.

Damuni or **Daumini**, a race of *D. alata* in Fiji (Hazlewood and Seemann).

Damuni masira, a race of *D. alata* in Fiji (Wright).

Dangkanda, for *D. bulbifera* in the Raipur district of the Central Provinces of India.

Dannini (Hazlewood and Seemann), by error for Damuni, q.v.

Dardi or **Dardi kanda**, for *D. oppositifolia* in the Amraoti district and for *D. velophylla* in the Amraoti and Betul districts, Berar and Central Provinces of India.

Daun apostema given by Rumpf as = Daun bisol, in Amboina.

Daun bisol, given by Rumph as a name for a *Dioscorea* which cannot be recognised, but of the section Enantiophyllum, in Amboina.

Daun kepeng-kepeng = coin leaf, for *D. nummularia* in Amboina.

Daun pitis-pitis = coin leaf, for *D. nummularia* in Amboina.

Daun ubi = leaf yam, a name given by Rumpf as for *D. nummularia*.

Dava karandi (Rheede), for *D. pentaphylla* in S.-W. India.

Davunikoka, a race of *D. alata* in Fiji (Wright).

Day-su-van, for *D. bulbifera* in Tonkin.

Debbar, said to be a hill name for *D. pentaphylla* in the Dehra Dun district, N. W. Himalaya.

Debir ashan alu = Durga's seal yam, a race of *D. alata* in the district of Maimensingh, Bengal.

De-emi, a yam of N. Caledonia in the Ate language.

Deh-enh or **Deh-eno**, a yam of Caledonia in the Voi and Ate language.

Denni or **Dhenni**, either *D. aculeata* or *D. alata* in the State of Travancore.

Dere sanga, for *D. glabra* in the Ranchi district, Chota Nagpur.

Desa pendalam, a race of *D. alata* in the Ganjam district, Circars.
Desavalli pendalam, country pendalam, for a race of *D. alata* in the Circars.

Desi alu = country yam, a race of *D. alata* in the Narsinghpur district, of the Central Provinces of India.

Desmonan, for *D. bulbifera* in N. Caledonia (de Lanessan).

Dhaiva, in the Naini Tal district for Debbar, q.v.

Dhan alu = grain yam, a doubtful name for *D. pentaphylla* in the district of Birbhum, Bengal.

Dhan mocha alu = grain bundle yam, from the balls of straw in which grain is stored, a race of *D. alata* in the Mymensingh district, Eastern Bengal.

Dhaulta alu = white yam, for a race or races of *D. alata* in northern Chota Nagpur.

Dhuru kanda = for *D. belophylla* in the Mirzapur district, Gangetic plains, probably a distortion of Dakur kand.

Diangga, for *D. hispida* in Bali.

Diba, for a race of *D. esculenta* in the Hanuabada language, Papua.

Die-nambue, a yam of N. Caledonia in the Voi language.

Dikama, a race of *D. alata* in Fiji (Wright).

Dila, a yam of N. Caledonia in the Voi and Ate languages.

Diomali, a yam of N. Caledonia in the Ate language.

Dinogo, a race of *D. alata* in Luzon.

Dipou, a yam of N. Caledonia in the Voi and Ate languages.

Do khnoch, for *D. hispida* among the Khmers in Cochinchina (Pierre).

Dodda kurudu, for *D. bulbifera*, received from the Madras presidency.

Dogue, in Luzon for Tugui, q.v.

Dokoro or **Tokoro**, for *Dioscoreas* of the section *Stenophora* in Japan.

Dondeli kand, for *D. belophylla* in the Balaghat district of the Central Provinces of India.

Draigarh, a doubtful name for edible *D. pentaphylla* received from Suket State in the N.-W. Himalaya and possibly a distortion of debbar.

Dsojo, given by Kaempfer as a literary or borrowed Japanese name for *D. japonica*: cf. Daijo and Tsu ubi.

Dudh alu or **Dudhi alu** = milk yam a race of *D. alata* in the districts of Ranchi and Hazaribagh, Chota Nagpur. Also *dudhia aru*, for the same in the district of Etawah, Gangetic plains.

Dudung, for *D. myriantha* in Javanese; but see Butu.

Dukai, an Itaveg (Luzon) name for *D. esculenta*.

Dukka pendalam = pig's yam, for nauseous *D. pentaphylla* in the Vizagapatam district, Circars. See Dakur kand.

Dukur kand = pig's yam, for *D. bulbifera* in the Betul district of the Central Provinces of India.

Dulian or **Durian**, Ilocano names, Luzon, for *D. luzonensis* or *D. divaricata*: cf. Duvan.

Dunichi kanda, for *D. belophylla* in the Daurah district of the Central Provinces of India.

Duppe genasu, for a race of *D. alata* in the South Kanara district, W. India.

Dura alu, **Duri sanga** or **Dur sanga** = small yam, applied in the districts of Monghyr, Dinajpur, the Santal Pargunnahs and through Chota Nagpur to more than one yam; it is *D. esculenta* in the first two, but either *D. aculeata* or *D. belophylla* or *D. glabra* or edible *D. pentaphylla* in the others, all of the species serving as food and growing wild.

Durga chali alu = Durga's seat yam, a race of *D. alata* in the Murshedabad district, Bengal.

Duru aru, for *D. belophylla*, in Gangpur State, Chota Nagpur.

Duyan, the Pangasinan equivalent of Dulian, q.v.

Ed alu = ginger yam, for cultivated *D. pentaphylla* in the Darrang district of Assam.

Eda thengalia alu = ginger finger yam, for *D. esculenta* in the Sibsagar district of Assam.

Eddu toka dumpa = bullock's tail yam (Elliott), a yam of the Circars, probably a race of *D. alata*.

Eedava kilangu = May yam, for *D. spicata* in the State of Travancore.

Eenthi kacchel = date-fruit yam, for *D. tomentosa* in the State of Travancore.

Eër = yam, in the Kei islands: cf. Iwi.

En = yam, in the Kei islands, = Ayan.

Ein-myouk = garden yam, a general Burmese name for cultivated races of *D. alata*.

Elan, see Aelan.

Elan putih or **Maelan putih** = white Elan, i.e. *D. bulbifera* in South Ceram.

Elos elos hoi (Leschenault), ascribed to *D. myriantha* and intended for Huwi elos, q.v.

Erusumeri, for *D. alata* in Northern Arakan.

Eyamcha vetti lai kilangu, a race of *D. alata* in the Madras Presidency.

Fanganga or **Fangaga**, in the Bet-ilo language, Madagascar, for *D. Maculiba* (Heckel).

Fanna dakka (Leiden herbarium), as a Japanese name for *D. quinqueloba*, not recognised, but the second part evidently dokoro.

Farkia = yam, in New Guinea at Numforen.

Femafar, a yam of N. Caledonia in the Voi language.

Fena alu, a wild Dioscorea of the Darrang district, Assam, where it is sold and marketed for eating.

Founambouat, a yam of N. Caledonia in the Voi language.

Fouapendo, a yam of N. Caledonia in the Voi and Ate languages.

Ga, a race of *D. alata* in Fiji (Wright).

Gadi-gai, for *D. oppositifolia* among the Savaras in the Ganjam district, Circars.

Gado, applied to *D. esculenta* in the Island of Guam, Marianne Is. It is Dago twisted round.

Gadong, Gadung, Gadueng, Gadhung, Ghadung, Gadu, Ganrong, a very interesting series of names which unqualified are applied to *D. hispida* where Malay is spoken. Gadong samak in the Malay Peninsula is *D. laurifolia* locally. Among the Bataks of Sumatra where there is a verb men-gadong = to plant yams, Gadong has a wider and more generic meaning. Eight kinds of yam pass as Gadong among these Bataks, and three are recorded for Achin. Elsewhere two are more usually recognised. It is possible, perhaps, that two names may in most places belong to *D. hispida*, and then the balance must belong to other Dioscoreas, except that sometimes *Smilax* spp. are termed Gadong e.g. Gadong China—Chinese Gadong, and Gadong tikus—rat Gadong. The form Ganrong comes from the Dyaks of S. E. Borneo: Gadu from Bima: Gadueng from Menangkabau, Sumatra.

Gadung adong = black gadong, in Achin.

Gadong belaka, among the Bataks.

Gadung bodas = white gadung for *D. bulbifera* in the Pre-anger Residency of Java.

Gadong goya, among the Bataks.

Gadong holiholi, among the Bataks.

Gadong jae, in the Sembiran dialect of Bali.

Gadong jalor, among the Bataks.

Gadung kasturi = musk gadung, in Bali.

Gadung ketan, in Java.

Gadung kuning = yellow gadung, in Java.

Gadong lekat = glutinous gadong in Achin.

Gadung malati = jasmine gadung, in Bali.

Gadung pira na manuk, among the Bataks probably *D. alata*.

Gadong ranek, among the Bataks.

Gadong rambe, among the Bataks.

Gadung ramping, among the Bataks, probably *D. alata*.

Gadung rimbo = forest gadung, for *D. hispida* in S. W. Sumatra.

Gadong samak = dyeing gadong, for *D. laurifolia* in the Malay Peninsula.

Gadung si apur, among the Bataks, probably *D. alata*.

Gadong tombong, in Bali.

Gadong ur = Coconut gadong, in Achin.

Gadungan, see Werung.

Gagarubro, a Naga name for *D. Hamiltonii*.

Gai = yam, in Savara, see Adabgai, Butigai, Barogai, Qadigai, Margodi gai, Parogai, Tumangai.

Gaibol, for *D. anguina* in North Cachar.

Gaicha alu or **Gachua alu** = yam of thickets, for *D. bulbifera* in the districts of Dacca and Mymensingh, Bengal.

Gajaria or **Gajar**, for *D. pentaphylla* in the Jhansi district.

Gakn or **Gang** or **Gong**, for some edible root either a *Dioscorea* or *Ipomoea Batatas* (which is of course American) among the Sakais of N. Perak, N. Pahang and Kelantan. As the Sakais clip Malay words greatly Gadong is possible in it.

Galelua, apparently used in Jhansi for a *Dioscorea*.

Ganduy, for *D. luzonensis* in Luzon (Kamel).

Ganesh alu, for *D. anguina* in the Midnapur district, Bengal.

Gangajali alu = Ganges water yam, from the colour, for cultivated *D. pentaphylla* in the Murshedabad district, Bengal.

Gangarua, a race for *D. alata* in the Kangra district of the N.-W. Himalaya.

Ganjir or **Gajir**, edible *D. pentaphylla* in the North West Himalaya = Gajaria and Ghajir.

Gap, see Bigap.

Garaba, said to be used in the Cuttack district, Orissa, for *D. bulbifera*.

Garania alu = yam like a guran wood pole, a race of *D. alata* in Lower Bengal.

Gath alu, for *D. bulbifera* among Marathas, doubtless from Genth.

Gathour kand, for *D. bulbifera* in the Narsinghpur State of S. Rajputana, from Genth.

Gayos, for *D. hispida* in the Visayan language, Luzon (Blanco), = Kayos in Tagalog.

Gedi-stara or **Gedi-sara**, for *D. alata* in the Vizagapatam district, Circars.

Gembili, **Gembilim**, **Gembiliem**, Javanese forms of Kombili, for *D. esculenta*.

Gembolo, for *D. bulbifera* in Java, the same word as Kambuhu.

Genasu = yam, in Kanarese; and standing alone may refer to *D. esculenta*. Genasu muli = thorny genasu the same: genasu mudi.

Genth, **Genthi**, **Gethi** = ? a small ball, for *D. bulbifera* in allusion to the bulbils, a wide spread name in western Hindi, the Pahari, Bhari and to some extent eastern Hindi dialects, and giving rise to modifications in other languages e.g. Angetha, Agitha, Ghita torul, Gath alu, Ghenti gath gathour kand, and probably Geta torul.

Gere arg-alla, for a race of *D. alata* in Ceylon.

Geta torul, for ? *D. bulbifera* in Nepal.

Ghadung, see **Gadong**, of which it is a form used in Madoera.

Ghajir or **Ghanjir**, for edible *D. pentaphylla* in the districts of Almora and Naini Tal, N.-W. Himalaya, and Gajaria in Western Hindi.

Ghandiali, for *D. alata* and *D. belophylla* in the Kangra district of the N.-W. Himalaya.

Ghar = domestic, in Hindi, etc.

- Ghar alu** = domestic yam, for *D. alata* in the Murshedabad district, Bengal.
- Ghar genthi** or **Ghar gethi** or **Ghar gita** = domestic gethi, for cultivated *D. bulbifera* in the N.-W. Himalaya, see Genth.
- Ghar tarur** = domestic tarur, for *D. alata* in the Dehra Dun district, N.-W. Himalaya.
- Ghar torul** = domestic torul, in the paharia dialect for all cultivated yams.
- Ghari alu** or **Gari**, for *D. bulbifera* in the districts of Saugor, Betul and Hoshangabad in the Central Provinces of India. Also in the last named district *D. belophylla* is confused under it.
- Ghas alu** = grass yam, for *D. aculeata* in Chittagong.
- Ghelehati** or **Gheleath**, a yam of N. Caledonia in the Voi and Ate languages.
- Ghenti**, in Chota Nagpur, for Genth q.v.
- Ghita torul**, in Sikkim *D. bulbifera* or by misapplication *D. belophylla*.
- Ghuwak**, for *D. alata* in the Kangean i-lands, east of Madoera.
- Giay nan**, for *D. hispida* in Cochin China (Pierre): possibly Kywe nan.
- Gin bik pya**, a very doubtful name from Prome. Lower Burma for *D. birmanica*.
- Girchi kand**, for *D. anguina* in the district of Jabalpur and Raipur, Central Provinces of India.
- Gita** or **Githa**, for *D. bulbifera* in the Behari language from the district of Gorakhpur to the Sikkim Himalaya at least among Nepali settlers. Cf. Genth.
- Gitora kanda**, for *D. bulbifera* in the Bilaspur and Mandla districts of the Central Provinces of India.
- Gobadu**, for edible *D. pentaphylla* among the Korkus of the Ellichpur district, Berar.
- Gcemi rotto rotto**, according to Rumpf the Ternate equivalent of Tali babounji.
- Gogdu**, for *D. bulbifera* in the districts of Buldana and Amraoti, Berar, and also for *D. aculeata* and *D. belophylla*. Is the word the same as the last but one?
- Goin**, a yam of N. Caledonia in the Voi and Ate languages.
- Goinchi alu**, a yam of the Malda district, Bengal.
- Gointia alu**, ascribed to *D. aculeata* by Heinig, in the Chittagong district.
- Goj alu** or **Guz alu** = peg yam, a race of *D. alata* commonly used in Bengal. Also *goj lai alu* = red peg yam.
- Gokaru**, for edible *D. pentaphylla* in South Kanara.
- Gol rataiu** = round ratalu, a race of *D. alata* in the Ganges plains.
- Gon alla**, either for *D. pentaphylla* or for *D. spicata* or for *D. intermedia* in Ceylon.
- Gona**, for *D. vexans* in the Andaman islands among the Beas and Balawas.
- Gone**, a race of *D. alata* in Fiji (Wright).

Gong or **Gang** (Sakai). see Gahn.

Gonthi, for Genth in the district of Hazaribagh, Chota Nagpur.

Gora = sweet (Marathi), and doubtless the origin of the Anglo-Indian name "Goa potato" for *D. esculenta* lies in the word.

Gor-adu, a well known race of *D. alata* from Bombay east to Amraoti and Poona.

Gora karandas, edible *D. bulbifera* all along the coast from Surat to Goa.

Gor-kan, the same as the last and with it.

Gorabu alu, a race of *D. alata* in Jessore, Bengal.

Gota, for *D. hispida* in the Kotah State, W. India.

Gowi = yam, in the island of Nias, west of Sumatra. If the G. can have come from K., we have here the equivalent of Khoai.

Grabon, a yam of N. Caledonia in the Ate language.

Gu boh shu tin = ox-tail tuber creeper, a central Chinese name for *D. acerifolia* (Diels).

Guiaba, **Gyaba** or **Gyah**, for *D. acerifolia* (Diels).

Gulakiri wel-alla, for a race of *D. alata* in Ceylon.

Gumma ratalu, a race of *D. alata* in the Mainpuri and Etawah districts of the Ganges plains.

Gun, for *D. deltoidea* in the Kamaon Himalaya.

Guna pendalam, round *D. alata* in the Circars (Elliott).

Gunga, for *D. aculeata* in Sylhet, Assam.

Gur alu = molasses yam, formerly used for *D. esculenta* in Bombay like Goa potato: and used now for a race of *D. alata* in the Murshedabad district, Bengal.

Guraniya alu = yam like a guran pole, a common name for a race of *D. alata* in Lower Bengal.

Gurarya kand, for *D. anguina* in the State of Barwani, Rajputana.

Guri, for *D. belophylla* among the Korkus.

Guti alu = little ball yam, for *D. pentaphylla* in the Sibsagar district, Assam, probably in allusion to the bulbils, and having the meaning of Genth.

Haldia alu = orange-coloured yam, for *D. unguina* in the districts of Nowgong and Darrang, Assam.

Halgujia alu or **Haljukia alu** = Hal-fish yam, a race of *D. alata* in the Brahmaputra valley.

Hampas tagbalang, said to be a yam in the Philippine islands.

Handia alu = cooking pot yam, a race of *D. alata* in the Cuttack district, Orissa.

Hanki genasu, for *D. belophylla* in the district of Malabar, Western India.

Hanla alu, a race of *D. alata* in Sylhet, Assam.

Harame baireo, a Naga name for *D. anguina*.

Harad bhu, for *D. bulbifera* in the Ranchi district, Chota Nagpur.

Harau, for *D. esculenta* in the Nadroga language of Fiji (Wright).

Hari imo, used by Japanese botanists for *D. esculenta*.

Harin khuray alu, a race of *D. alata* in the Bankura district, Bengal.

Harin pala alu = antler yam, a race of *D. alata* in Bengal.

Haser sanga, for *D. pentaphylla* and sometimes for *D. belophylla* in the districts of Hazaribagh and Singhbhum.

Hasila = yam, at Oya in Sarawak (Moulton).

Hastyaluka (sanskrit) = elephant yam, probably for a race of *D. alata*. Dallana in the 12th century said it was a large form of Kasthaluka.

Hathigorwa alu, a race of *D. alata* in the Ranchi district, Chota Nagpur.

Hathidanta alu = elephant tusk yam, a race of *D. alata* in the Narsinghpur district, Central Provinces of India, and **Hathidatia**, of the same meaning in the Brahmaputra valley.

Hati kujia alu = elephant's foot print yam, a race of *D. alata* in the Darrang district, Assam.

Hathi muria, a race of *D. alata* in the Darrang district, Assam. Bahmuria is also *D. alata*.

Hati pae alu = elephant's foot yam, a race of *D. alata* in the Murshedabad district, Bengal.

Hathia kand = elephant's yam, for *D. bulbifera* and *D. pentaphylla* in the Shahabad district, Bengal.

Hau or **Ha-u** = yam, among the Pangan in Ligor State, Lower Siam and the Semang in Kedah (Blagden). Cf. Khoai.

Hauw sina, given by Teijsmann as perhaps a *Dioscorea*, and in use in Timor.

Hayuru, Hayuro, Hayule, for *D. hispida* in the Molucca Is.

Heg genasu = sweet genasu, for edible *D. bulbifera* in North Kanara.

Heli, Heri = yam, or often *D. alata*, in some of the Molucca islands. Cf. Huwi.

Heli and **Heri assapin** = finger yam, for a race of *D. alata* in Amboina (Rumpf).

Heli and **Heri makalaun** or **Heli maki laun** = artocarpus leaf yam similarly used.

Heli malonia, for a race of *D. alata* in Banda Is.

Heri manu, for red fleshed *D. alata* in S. Ceram and Amboina.

Heli nya or **Heri nya** = snake yam, for a race of *D. alata* in Amboina (Rumpf).

Heri puti = white yam, for *D. bulbifera* in Amboina and the Uliassers.

Heri soun laun = artocarpus leaf yam, for a race of *D. ulata* in Amboina.

Heofika or **Hofika**, Sakalava and Hova names, Madagascar, for *D. heteropoda* and *D. Hoffa*. Cf. Ofika, and recall Blagden's suggestion that Hubi in Sakai is possibly older than Ubi in Malay.

Hepe, a yam of N. Caledonia in the Voi and Ate languages.

Hibag-ye, said to be *D. oppositifolia* in the Poona district, W. India.

Him kukul alla = little cock's yam, a Cinghalese name for *D. esculenta*, on account of the spur like thorns on the roots.

Himboueh, a yam of N. Caledonia in the Ate language.

Hime tokoro = small tokoro, a Japanese name for *D. tenuipes*.

Hingur alla, for a race of *D. alata* in Ceylon.

Hiritala = benumbing yam, a Cinghalese name for *D. oppositifolia*.

Hirmati, a Gond name for an undetermined Dioscorea, the same as Pidi kanda.

Hituu, for *D. pentaphylla* in Pete, Moluccas (Rumpf).

Hiwu = yam, in the island of Savu, near Timor.

Hiwu butu, for *D. alata*. See Butu.

Huwi wara, for *D. bulbifera*.

Hiyahu, for *D. esculenta* in the island of Halmaheira.

Hkad-hkyo, a well known Burmese name for *D. birmanica*.

Hkadhkyo pyu = white Hkad-hkyo, for *D. membranacea* in the Pakokku Hills.

Ho, the Shan word for yam.

Ho-kho, for *D. bulbifera*.

Ho-koi, for *D. hispida*.

Ho-man-kawk, for a wild edible Dioscorea, apparently *D. alata*.

Ho-wuk, for a wild edible Dioscorea.

Hofikara, for a Dioscorea in the Hova language of Madagascar.

Hoi, for *D. bulbifera* in the Hawaiian Is., Friendly Is. and Tahiti.

Honda, a yam of N. Caledonia in the Voi and Ate languages.

Hone sanga, for *D. belophylla* in Singbhum.

How-wai, for a yam in the Kamee language, Arakan (Gwynne-Hughes). It suggests Khoai.

Hputsa or **Hputsa-u**, a well known Burmese name for nauseous *D. pentaphylla*.

Hra or **Khah**, the Chin word for yam, connected with khoai.

Hra burr, a race of *D. alata*.

Hra hnim, for edible *D. pentaphylla*.

Hra let, for *D. esculenta*.

Hra lien, for a race of *D. alata*.

Hra parr, a race of *D. alata*.

Hra pree, a race of *D. alata*.

Hra tow, for *D. bulbifera*.

Hra trol, a race of *D. alata*.

Hua, in Laos for some yams, = Khoai.

Hua kathal, said to be for *D. esculenta* in Laos, being the same as Khoai lo.

Hua man phao, for a race of *D. alata* in Laos.

Hua pao, for *D. bulbifera* in Laos.

Hua thuck, for a race of *D. alata* in Laos.

Huai chan yao = Huai hill medicine or ? hill medicine of Huai shien, unidentified *Dioscoreas* used medicinally of origin in Shensi and adjoining provinces of China. Huai perhaps = Khoai.

Huang chiang = yellow ginger, a central Chinese name for more than one *Dioscorea*, e.g. *D. zingiberensis* (Henry) and as *huang chiang teng*, for *D. japonica* (Rosthorn), and as *huang chiang tou teng*, for what Diels calls *D. glabra*. *Huang tou teng* is ascribed by Diels further to *D. bulbifera* with a question mark.

Huang yao = yellow medicine, may belong to a *Dioscorea*, in Szechuan (Hosie).

Hubi = yam, in Sakai. Blagden suggests that *hubi* is older than the Malay *ubi*: but the form of the word in Madagascar is without the *h* in most cases.

Hubi gak, used by Soman, a mixed negrito tribe of N. Perak speaking a mixture of Malay and Sakai, would seem to be *Ipomoea Batatas*: see Gakh.

Huelyo or **Hueelyo** = yam in the islands of the Uliasser, Amboina group.

Huelyo putih = white yam, for *D. bulbifera* on the island of Saparua.

Huelyo puil, for *D. bulbifera* in Nussa Laut of the Uliasser.

Hukai, for *D. anguina* in Sylhet, Assam, suggesting Khoai.

Hulahaya kanda, for *D. hispida* in the district of Raipur, Central Provinces of India.

Hura, said to be applied to *D. oppositifolia* in the Sika language of Flores; but it is probable that *D. alata* is meant.

Huwi = yam, in Sundanese.

Huwi badak kuning = yellow fan yam, a race of *D. alata*.

Huwi badak manis = sweet fan yam, a race of *D. alata*.

Huwi buah = fruit yam, said to be *D. hispida*, but *D. pentaphylla* is probable.

Huwi butun or **Huwi buton**, a race of *D. alata*. Cf. Butu.

Huwi chekker, for *D. pentaphylla*.

Huwi churuk, for *D. myriantha*.

Huwi dewata = divine yam, for edible *D. pentaphylla*.

Huwi dudung or **Huwi tutung**, for *D. anguina*: see Butu.

Huwi elos, for *D. alata* and *D. myriantha*.

Huwi gadung, for *D. hispida*.

Huwi jahe = ginger yam, for *D. pentaphylla* and the very closely allied *D. Blumei*.

Huwi klapa = coconut yam, for a race of *D. alata*.

Huwi kawaiyung or **Huwi kawoyang** = benzoin yam, for *D. pyriformis* apparently.

Huwi landak, for *D. esculenta*.

Huwi lilin = wax yam, a race of *D. alata*.

Huwi mamayung, a variant of *Huwi kawaiyung*.

Huwi mantri = priest's yam, for edible *D. pentaphylla*.

Huwi mengareh = jungle yam, for a race of *D. alata*.

Huwi ohe ai and **Huwi ohe padang**, races of *D. alata*.

Huwi orei, a race of *D. alata* in Java.

- Huwi panjang**, long yam, for a race of *D. alata* in Java.
- Huwi pulun** = sticky yam, a race of *D. alata*.
- Huwi sawat** or **Huwi sawut** = fibrous yam for *D. pentaphylla* or *D. hispida*.
- Huwi sawut jahe** = fibrous ginger yam, for *D. pentaphylla*.
- Huwi saut ketam**, for *D. Blumei*.
- Huwi teropong** = pipe yam, probably for a race of *D. alata*.
- Huwi tihang** = post yam, and **huwi tihang merah** = red post yam, for races of *D. alata*.
- Huwi upas** = poison yam, for *D. bulbifera*.
- Iaë**, for *D. pentaphylla* in the island of Locho, Moluccas (Rumpf). (cf. Ahey).
- Iamme imo**, Kaempfer's spelling of Yama imo.
- Ibi** = yam, in the Tooen-awan dialect of the Alfuri language of Minahassa.
- Ichi nen imo** = annual yam, a watery inferior race of *D. opposita* in Japan, quick to mature.
- Icho imo** = wood yam, a race of *D. opposita* in Japan.
- Ie-chay-io** (for ? Ye shan yu), a wild yam eaten in the Chinese province of Kwei-chow (Esquirol).
- Ihu** = yam for Huwi in Ceram.
- Ima, Imah** or **Imati** = yam chiefly, but for *D. alata* in Ternate.
- Imah kastela** = Castile yam is *Ipomoea Batatas*.
- Ima pariaman**, is surely a race of *D. alata*.
- Imo** = yam, in Japanese.
- Indapan**, a race of *D. alata* in the Philippine islands.
- In dioh**, a yam of N. Caledonia in the Ate language, the same as Femafar.
- Iniog**, a race of *D. alata* in the Philippine islands.
- Invod**, for a race of *D. esculenta* in Palawan island.
- Ipoi**, an Igorot name for *D. alata*.
- Iribani**, a race of *D. alata* in Fiji (Wright).
- Isahu** and **Isiyahu**, for *D. esculenta* in the island of Ceram. Cf. Siyahu, etc.
- Ise-imo** = yam of Ise, a race of *D. opposita* in Japan.
- Itulad sanga**, for *D. pentaphylla* among the Kols.
- Iwi**, yam, in Sumba island. Iwi, Hiwu, Wohiu, Wiwi and Wili make an interesting group of names.
- Jabbet**, for *D. pentaphylla* among the Sakais; and as Ubi jabbet.
- Jaawa-al**, see **Jav-alla**.
- Jangalia alu** = jungle yam, in the Jalpaiguri district, Bengal.
- Jahreng**, for edible *D. pentaphylla* in the Ranchi district of Chota Nagpur.
- Jambur alla** = deep-going yam, a Cinghalese name for a *Dioscorea* which if not *D. oppositifolia* is very near to it.
- Jagalia alu**, for *D. oppositifolia* in the Ali Rajpur state, W. India.
- Jangga**, for *D. hispida* in Bali.
- Jangli alu** = jungle yam, for *D. bulbifera* in the Dinajpur, Jalpaiguri and Mymensingh districts, Bengal.

Jangli mataru, similarly used in the district of Bhandara, Central Provinces of India, and for *D. hispida* in the Chanda district.

Jangli gethi = jungle genth in the Raipur district, Central Provinces of India.

Jangli ratalu = jungle ratalu, wild *D. alata* in the Betul district of the Central Provinces of India.

Janun sanga, for *D. glabra* among the Kols in the States near Balasore, Orissa.

Japana alla = Jaffna yam, a race of *D. alata* in N. Ceylon.

Japara alu = hairy yam, a race of *D. alata* in the Brahmaputra valley.

Jari kanda, a Dioscorea of the Raipur district, Central Provinces of India.

Jav-alla or **Jaawa al**, for *D. esculenta* in Ceylon.

Jaya or **Jayat**, obtained from Sakais and Mentera in the territory of Malacca: ? = Jabhet.

Jebubug basu and **Jebubug endog**, for *D. bulbifera* in Java.

Jechi imo, a race of *D. opposita* in Japan.

Jehu gale, either yam or tapioca, among Sakais of Ulu Bertang in Perak (Blagden).

Jhum alu = clearing yam, for *D. bulbifera* in the Chittagong district.

Jiari khoda alu, for *D. glabra* in the Sibsagar district, Assam.

Jinenjo, for *D. japonica* in Japan (jinen = wild); cf. Daijo.

Jingjing, an Abor name for a Dioscorea.

Jugur kanda, for *D. aculeata* in the district of Bilaspur, Central Provinces of India.

Ka aing myouk, a Burmese name for a race of *D. alata* in Northern Arakan.

Ka-lau, for *D. bulbifera* in the Honam islands, Kwangtung Province, China.

Ka shru, for *D. alata* at Jowai in the Jaintea hills, and perhaps for other plants.

Ka shru lieh, the white yam.

Ka shru mynshong

Ka shru saw, the red yam.

Ka zung she, a Kuki name for *D. assamica*.

Kabaloi, a race of *D. alata* in the Philippine islands.

Kabui, a yam of N. Caledonia in the Ati language.

Kaburan, said to be *D. bulbifera* in Madoera, with the following kinds whose names however suggest that Kaburan is more than one species.

Kaburan bhabang.

Kaburan chena.

Kaburan chechek.

Kaburan ghadjam.

Kaburan tekes.

Kabuvo or **Kasuvo**, for *D. bulbifera* in Ternate and in Celebes (Rumpf).

Kacchel kilangu, for *Dioscoreas* in Travancore.

Kacheo, a Lepcha name for a variety of *D. bulbifera*, Sikkim Himalaya.

Kacheo bok differs, and is another variety.

Kaching or **Katching**, a Lepcha name for *D. bulbifera* covering all its varieties, Sikkim Himalaya.

Kachkachia = ? hard yam, for *D. glabra* in the district of Birbhum, Bengal.

Kachma bok, for *D. lepcharum* in the Sikkim Himalaya.

Kachu, for Kacheo bok at the foot of the Sikkim Himalaya.

Kadat, the general Burmese name for *D. aculeatu*. It may be that Khoai is in the first syllable.

Kadu = wild in Kanarese.

Kadu kilangu, for several wild yams. The missionary Metz who collected Hohenacker's Malabar plants wrote the name Kadu keringu, and this spelling has received a circulation.

Kadu karandas, for the wild varieties of *D. bulbifera* from Bombay southwards in contrast to Gora karandas.

Kadu-u, a general Burmese name for *D. bulbifera*. Khoai may be in the first syllable.

Kadwe-u, for tahdwe-u.

Kaede dokoro = several-pointed tokoro, for *D. quinqueloba* in Japan. Cf. Kai.

Kaeo, for *D. pentaphylla* in Bima (Rumpf). But kaio in Tarawan I. in the Pacific stands for an Aroid, probably *Colocasia*.

Kaha fa-alla, for a race of *D. alata* in Ceylon.

Kaju or **Kachu**, for a yam in the Nilgiri hills, see Nadu kaju and Thavai kaju.

Kai or **Ke-imo**, a literary, that is a borrowed name of Japan. Kaempfer gives this as for *D. quinquefolia* but at the same time states that it is edible, so belying himself; Siebold, however, for a cultivated edible *Dioscorea* which he calls *D. sativa*, and which seems to be *D. bulbifera*.

Kai chan tang, for *D. Bentharii* in the Kwangtung province.

Kaile, for *D. bulbifera* in Fiji, whether with nauseous or with edible bulbils.

Kaile tokatolu, for *D. pentaphylla* in Fiji (Wright).

Kaio, for yam in the Gilbert islands.

Kaironi, for *D. Loheri* in Tagalog (Blanco).

Kaisali = yam like a lock of hair, for a race of *D. alata* in the Bakarganj district of Lower Bengal.

Kala kand = black yam, for *D. bulbifera* in the district of Nimar and in adjoining parts of the Central Provinces of India.

Kalai alu = bulbil yam, for *D. anguina* in the Birbhum district of Bengal.

Kalar mura = yam with the plantain-root, for a race of *D. alata* in Sylhet, Assam.

Kal genasu = black genasu, for *D. bulbifera* in the Malabar district S.-W. India.

Kalkur = *D. bulbifera* var. *eloagula* at Cooktown, Queensland.

Kalla kacchel, a race of *D. alata* in Travancore.

Kalue, for Kolo, q.v., about Khurda, western Bengal.

Kalut, Karot, Karoti, Kolot, Korot, Kulot or Orot or Orkot, names for *D. hispida*, the first in the language of Tagalog, and Pampangan, the second of Ilocano, the third in Sulu, the fourth and fifth in Visayan, and the last in Visayan. Kayos is the same name doubtless.

Kamala kilangu, for *D. spicatu* in the Malabar district, W. India.

Kamange, for *D. luzonensis* in the Ilocano language, North Luzon.

Kamarire, for *D. grata* in Luzon.

Kambubu, for *D. bulbifera* in the island of Madoera.

Kamiging, a Bikol name for *D. esculenta*, Luzon.

Kamodia = scented like kamod rice, a race of *D. alata* in the Surat district, Bombay.

Kanasi torul, a race of *D. alata* in Nepal and Sikkim, marked by its autumn sprouts.

Kancheong or Kanchen bok, for *D. sikkimensis* among the Lepchas of the Sikkim Himalaya, perhaps misapplied to *D. belophylla*.

Kand or Kanda = yam in Hindi, but unqualified in Kandesh and adjoining parts of the Bombay presidency indicating *D. bulbifera*, or in Behar *D. alata*.

Kand kariya, see Karu kanda.

Kandmul, a hybrid Hindi-sanskritic word applied to *D. bulbifera* in the Jhansi district of the Central Provinces of India.

Kangar, seems to be *D. esculenta* in the Poona district.

Kangta alu (Buchanan-Hamilton), as used in the Rangpur district for *D. esculenta*; probably meant for Kanta alu.

Kanji, for *D. oppositifolia* in the State of Travancore, see Kanti Kanji.

Kanta alu = thorny yam, may be, now one species, now another, Central Provinces of Bengal.

Kanti kanji, Kanti kangia, Kanti kangar, Kanti kanang, Kanti kankari and **Kanti konaghar** for *D. esculenta*, from Bombay to Goa, where Kanji now is *Ipomoea Batatas*.

Kanuwa, Khanuwa or Khinuwa, for a race of *D. alata* in several districts of the Central Provinces of India and in Baghelkand; once applied to *D. bulbifera* in the Jhansi district. Cf. Khaneya.

Kao, for *D. pentaphylla* in Bima.

Kapak = Sasak (Lombok) name, for *D. hispida*, apparently connected with the next.

Kapo, Kapu, Kapots and Kaput = yam, in Minahassa, often applied to *Ipomoea Batatas*.

Kapu antadun or Kapu an talun, apparently a race of *D. alata*.

Kapu gu, for *D. myriantha*.

Kapu kayu, for *D. hispida*, but the name would fit tapioca better.

Kaput laka, a race of *D. alata*.

Kaput loken or **Kaput lokon**, a race of *D. alata*.

Kaput na wiyo, for a Dioscorea probably *D. nummularia*.

Kapu rangdang or **Kapu rundang**, for a race of *D. alata*.

Kapu sayawu, for *D. esculenta*: see Sayawu.

Kapu sayor = vegetable Kapu for *D. pentaphylla* doubtless an edible race or the name is the same as the last.

Kapu wuol, said to be for *D. esculenta* in Celebes.

Kappa kavalli, for a race of *D. alata* in the Tanjore district.

Kappan kachel = ship yam, a race of *D. alata* in Travancore and also the tapioca plant, perhaps mis-applied to *D. alata*.

Kapu or **Kaput**, see Kapo.

Kapu, for *D. bulbifera* or *D. anguina* in the Sontal Pergunnahs.

Karamisan, a race of *D. alata* in the Philippine islands.

Karha, **Karaba** or **Korba**, for nauseous *D. pentaphylla* in the several districts of Orissa.

Karanda, **Karandas**, **Karandi**, **Karinda** and **Karanza**, Marathi names for *D. bulbifera* from the district of Khandesh southwards to that of Poona. Under the spelling Carandi, Rhede got it, presumably in Malabar, and ascribed it to *D. pentaphylla*, perhaps mis-applied. See Karu kanda.

Karat, for *D. esculenta* in Pangasinan, Luzon, perhaps misapplied.

Karnamul alu or **Karnamuli alu** = ear yam, for *D. esculenta* in the Bardwan and Bankura districts of Bengal.

Karodi, ascribed by Rhede to *D. hispida* in Malabar.

Karundu = yam in the Kangean Is., east of Madoera.

Karroo, for *D. bulbifera* in Queensland on the Mitchell river.

Karu kanda or **Karawa kand** = bitter yam, for *D. bulbifera* commonly all through the Central provinces where Eastern Hindi is spoken and in the Central Provinces and Central India where Western Hindi is spoken and into Khandesh; the origin of the Marathi Karanda, q.v.

Karu pendalam, for *D. esculenta* or any other little known yam in the Circars.

Karu pendalam dumpa, Elliott recorded this mixture of Hindi and Telegu as indicating several wild Dioscoreas in the Circars.

Karulmati, the Gond form of Karu kanda, for *D. bulbifera*.

Karunai valli kilangu = twining stick yam, for *D. oppositifolia* in the Salem district, Madras.

Karwi genthi or **Karwi gethi** = astringent genth. for wild *D. bulbifera* in the N.-W. Himalaya.

Kasa alu = ? bitter yam, for *D. anguina* in the districts of Angul and Balasore.

Kashiu dokoro or **Kashiu imo** = yam of Kashiu, Japanese names for cultivated *D. bulbifera*.

Kasi, for *D. pentaphylla* in the Igorot language, Luzon.

Kasimun, for *D. hispida* among Malays in Timor.

Kasokaso (erroneously also as Kasoni), a race of *D. alata* in Fiji.

Kassok, for *D. pentaphylla* in the Lepcha language, Sikkim in two forms.

Kassok ding.

Kassok tuk zhok.

Kasthaluka (sanskrit), doubtless for a *Dioscorea*, probably *D. alata*, the origin of kathalu.

Katak, the Shan name for *D. birmanica*.

Katak, for *D. pentaphylla* and *D. bulbifera*, etc. in Javanese.

Katak bedak or **Katak bledak**, for *D. bulbifera* in the Madioen Residency of Java.

Katak bunga or **Katak wunga** = flowery katak in Java.

Katak dewot = sacred katak, in Java for an undetermined *Dioscorea* of the section *Euantiophyllum*.

Katak gulug, for *D. bulbifera* in the Residency of Java at Ngarengan.

Katak lawe, in Java.

Katama, for *D. warburgiana* in Celebes.

Katawalla = wild yam, for *D. pentaphylla* and perhaps for other wild yams in Ceylon. It was used in 1684 for *D. bulbifera* as Katuwala.

Katching or **Kaching**, for *D. bulbifera* among the Lepchas, Sikkim Himalaya, with the following varieties distinguished.

Katching simbha, for var. *Simbha*.

Katching katcheo.

Katching simpat.

Kath alu = woody yam, apparently for a race of *D. alata* in the district of Lakhimpur, Assam.

Kath aru, **Katha aroo** or **Katharua**, for *D. glabra* in the Ranchi district, in Gangpur State, Chota Nagpur, and for *D. esculenta* in Behar, Gangetic plains: from Kasthaluka, q.v., but neither of these species being hard fleshed, they may not have been the original Kasthaluka.

Kathar or **Kathar kand**, a race of *D. alata* in the district of Mirzapur, Gangetic plains: and sometimes used as = Ratalu.

Kathia, for a yam in the Voi and Ate languages of N. Caledonia.

Katsjil kelangu, Rheede's spelling of Kacchel kilangu, q.v.

Katilin, for *D. esculenta* in the island of Ceram.

Katu = wild, in Malayalam of S.-W. India and Cingalese. Cf. Katawalla.

Katu arg-alla, for a race of *D. alata* in Ceylon.

Katu kacchel, for *D. bulbifera* in S. W. India, and perhaps for other species. This is the name which Rheede spells Katu katsjil.

Katu kavathu kilangu, for *D. Hamiltonii* in Malabar.

Katu kilangu = wild tuber, for *D. aculeata*, *D. bulbifera*, *D. tomentosa*, *D. pentaphylla* and probably other species in S. India.

Katu kukul alla = wild cock's yam, for *D. esculenta* in Ceylon.

Katu nuren kilengu = wild fibrous yam, for *D. pentaphylla* in Malabar.

Katu valli kilangu = wild tuberous plant, for edible *D. pentaphylla* and *D. oppositifolia* in the districts of Trichinopoly and Salem, Madras.

Katu wella, for *D. pentaphylla* and *D. bulbifera* in Ceylon.

Kau, for edible *D. bulbifera* in the south-east of New Guinea (Garia),—possibly var. *sativa*.

Kauhaia kand or **Kauhia kand**, for *D. bulbifera* and for *D. belophylla* in the Balaghat district, Central Provinces of India. Keai kanda is doubtless of common origin, and both are connected with Khaneya.

Kaumaile, a race of *D. alata* in Fiji (Wright).

Kavalli, in combination with the Telegu word godda in N. Arcot for *D. alata*; with the Malayalam word kacchel in Travancore for *D. oppositifolia*; and with the Tamil word kilangu generally in S. India for *D. alata*.

Kawai, for *D. esculenta* in Fiji, doubtless from Khoai.

Kawuie, for yam in Solor.

Kaya pendalam, for *D. bulbifera* in the districts of Vizagapatam and Ganjam, Circars.

Kayin myouk, a Burmese name for a race of *D. alata* from Northern Arakan, possibly distorted, and meaning Kachin myouk. Kayin ni myouk of the Salween district is a red fleshed race of the same.

Kayos, for *D. alata* in Tagalog, Luzon, and for *D. hispida* and *D. pentaphylla*.

Kayuru, said to be *D. pubera* by van den Burg in Java but he seems always to designate *D. hispida* in that way.

Keai, for Kai.

Keai kanda = literally hand yam, but connected with Kauhaia kand, for *D. bulbifera* in the Chhindwara district of the Central Provinces of India.

Ke imo or **Kei** = said to mean hairy yam, but Ke seems to have come from the Chinese and to be connected with Khoai, for *D. bulbifera* in Japan: the word imo suggests cultivation.

Kedoni, for edible *D. pentaphylla* in the State of Travancore.

Kedro kand, for *D. bulbifera* in the Surat district, Bombay.

Kehna, said to be *D. hispida* in the Raipur district of the Central Provinces of India.

Keladi, the Malay word for *Ipomoea Batatas*, the sweet potato, mentioned here only because in print it has been said by van den Burg that Keladi leuweung and Keladi savor are *D. hispida*. This is certainly wrong: as that writer often was.

Kelona, see Akar kelona.

Kelibang or **Keribang**, for *D. alata* in West Borneo; abbreviations of Ubi kelibang.

- Kemhang**, among the Semang of Kedah, an abbreviation of Akar keminyan, q.v.
- Kemarung**, among Sakai of Pahang either for a Dioscorea or for *Ipomoea Batatas*, the sweet potato: cf. Kemhang.
- Kembili**, used in Java for Kombili, q.v.
- Kemili**, used by Sakais in Pahang for *Ipomoea Batatas*, the sweet potato, and possibly also for yams, as if it is derived from Kombili.
- Kenchung**, for *D. sikkimensis* among the Lepchas, Sikkim Himalaya = Kanchong.
- Keoma**, said to be *D. tomentosa* in the district of Arrah, Gangetic plains.
- Kerung**, see Werung.
- Ketabi** or **Kutabi**, = yam in Sumba I., Timor Sea.
- Keu**, erroneously for a race of *D. alata* in Fiji in Hazlewood's Dictionary.
- Ke-uchiwa dokoro**, a Japanese botanists' name for *D. nipponica*.
- Khah** or **Hra**, a Chin word for yam. See Hra.
- Khai alu**, a race of *D. alata* in the Chittagong district. The first word may be from Khoai.
- Khalait**, for *D. bulbifera* in the Andaman islands doubtless from the Burmese Kalet, and probably a newly introduced word.
- Khalet-u**, for *D. bulbifera* in Burmese in the Pakokku Chin hills, and the same word as Hra let.
- Kham alu** or **Khambalu** = pillar yam, a well known name for a race of *D. alata* in Lower Bengal, and the use of which extends to the eastern districts of the Central Provinces. It becomes Kham Karua and Khambarua in Behar and Khamra alu, in the Purneah district, Gangetic plains.
- Khambarua**, in eastern Behar for Kham alu.
- Khaneya**, **Khanewa** or **Khania kand**, for edible *D. pentaphylla* in the districts of Arrah, Shahabad, Monghyr, Palamau, Gaya and extending into Baghelkand in Central India.
- Khanti**, for edible *D. pentaphylla* in the Gonda district and Balrampur State, Gangetic plains, and also for *D. belophylla*.
- Khas alu**, a race of *D. alata* in the Chittagong District.
- Khat-cho**, phonetic spelling of Kkad-hkyo, q.v.
- Khatu-u-kyee** and **Khatu-u-pyu**, races of *D. esculenta* in the Toungu district, Lower Burma.
- Khirkand**, for *D. anguina* in the districts of Amraoti and Akola, Berar. Cf. Kikare and Kirchi kand.
- Khitta**, for *D. bulbifera* in the Suket State, N.-W. Himalaya.
- Khoai**, the Mon-Khmer word for yam. There are traces of it in the Arakan Hills, see How-wai, and possibly in Sylhet see Hukai and Khai: it is apparently in Northern Sakai in Kuwi and Bekoi. The invaders of the Mon-Annam kingdoms took it up, the Burmese in Kywe, and perhaps in other yam-names, the Siamese as Koi or Kloi. It seems to have found a place in Fiji as Kawai, and in China in Huai.

- Khoai bua** or **Khoai bua ydnou**, for a race of *D. esculenta* in Annam.
- Khoai buu**, Loureiro's name for his *Oncus esculentus* which is *D. esculenta*.
- Khoai chach**, for a race of *D. esculenta* in Saigon.
- Khoai dian nan**, for *D. hispida* in Cochín-China.
- Khoai leng** (Loureiro), for *D. cirrhosa* in Annam.
- Khoai lia**, a race of *D. alata* in Indo-China.
- Khoai lo**, said by Loureiro to be the same as Combilium and therefore *D. esculenta*, but his description belies this statement, and the name as used in Indo-China is doubtful. de Lanesan quotes it for *D. esculenta*.
- Khoai mai**, for a wild race of *D. alata* in Annam and Cochín-China or for *D. persimilis*.
- Khoai mo**, for a race of *D. alata* in Annam.
- Khoai mohai**, for a race of *D. alata* in Saigon (Pierre).
- Khoai nga** = elephant-tusk yam, for a race of *D. alata* in Annam.
- Khoai noc trang**, for a race of *D. alata* in Saigon.
- Khoai shan** = Huai shan (yao), in Tonkin the Annamese of that Chinese name (Regnault).
- Khoai siam**, a race of *D. alata* in Saigon.
- Khoai son** = mountain yam, for *D. persimilis* or for a race of *D. alata* in Tonkin.
- Khoai tia**, a race of *D. alata* in Annam.
- Khoai tiem**, a race of *D. alata* in Saigon.
- Khoai tir**, for *D. esculenta* in Annam and Cochín-China.
- Khoai tu bua**, a race of *D. esculenta* in Saigon.
- Khurmalu**, for a race of *D. alata* in the Bhagalpur district of Bengal, apparently a distortion of Kham alu.
- Kibaratasy**, for *D. hexagona* in the Betsimisarakana language, Madagascar.
- Kidetite**, a yam of N. Caledonia in the Voi language.
- Ki-e** = yam, in the Sakai dialect of Central Pahang. See Kuoi.
- Kikare** or **Kinkari**, for *D. oppositifolia* or for edible *D. pentaphylla* in the Ali Rajpur State of W. India.
- Kikim**, for yam in the Lampongs, Sumatra.
- Kikuba dokora** = hand-like tokoro, for *D. quinqueloba* in Japan, referring to the leaf.
- Kilangu**, in Tamil, for tuber.
- Kinampai**, a Bikol name (Luzon) for *D. alata*.
- Kimampu**, for *D. alata* in Cebu, Philippine islands (Blanco).
- Kina pendalam**, a race of *D. alata* in the Godavari district, Madras.
- Kine imo** = hammer yam, a race of *D. opposita* in Japan.
- Kinkari**, see Kikare.
- Kirach kand**, as the next used in the Seoni district.
- Kirchi kand** or **Kircha**, for *D. oppositifolia* in the Balaghat, Mandla and Saugor districts of the Central Provinces of India, probably of common origin with Kras kand.
- Kiri imo** = cutting yam, a Japanese name for *D. opposita*.

Kiri kondal, a race of *D. alata* in Ceylon.

Kirini, for *D. luzonensis* in the Tagalog language.

Kiri vel alla = milky stick yam, a race of *D. alata* in Ceylon.

Kiroi, Kiru, for *D. divaricata* and *D. myriantha* in the Tagalog language, Luzon.

Kitaotao, for *D. herugona* in the Hova language, Madagascar.

Kiu tu = ginger tuber, for *D. Owenii* in Hainan.

Kla-wong, a Semang word for a wild yam.

Klab, a Semang word for *D. hispida*, in Kedah.

Kloi, see Koi.

Koadi, a Jakun word from Jassin, Malacca, for ? yam: but can it be Keladi distorted?

Kobag, a Tagalog name variously applied, e.g. to *D. alata*, *D. luzonensis*, *D. Loheri*, *D. divaricata* and *D. myriantha*, the last two about Los Banos and the two before them according to Blanco's Flora.

Kochadia alu = the yam like Colocasia, ? in taste, for *D. anguina* the district of Angul, Orissa.

Kodi kavalli = creeper yam, for *D. alata* in the Tanjore district, Madras.

Kohata alla, a race of *D. alata* in Ceylon.

Koi or **Kloi** = yam, in Siamese. Sometimes heard as Mun kloi and among the Laos as Koi-i (Kerr).

Koi velli, for a race of *D. alata* in the Chingleput district, Madras. Is it Kavalli?

Kokathi, a yam of New Caledonia in the Voi and Ate languages.

Kolhua, for *D. hispida* in the Narsingpur district of the Central Provinces of India, connected with the last.

Kolo kand, Kulu kand, Kulu sanga, Kolki, Kulia or **Kulika** = jackal's tuber, for *D. hispida* through Orissa and Chota Nagpur, and westwards to the Melghat in Berar.

Kolot, Korot or **Kalut**, names in Ilocano and Visayan, Luzon, for *D. hispida*. Kolot was obtained by Eusebius about 1630 and rightly assigned by Rumph.

Kombili, for *D. esculenta* in the Moluccas becoming Kembili and Gembili in Java, and also Gembiliem; and found among the Sakais of the Pahang-Kelantan border as Kemili.

Kombili bulu, a race of *D. esculenta* in the Moluccas. See Bulu.

Kombili champadaka = chempedak-like yam, a race of the same named by Rumph. The chempedak is *Artocarpus polyphemia*.

Kombili fanturi, also a race of the same.

Kombili merah = red Kombili, for *D. alata* (v. d. Burg).

Kombu valli killangu = antler stick yam, for *D. intermedia* in Tamil as used in Ceylon.

Komori dokoro, for *D. nipponica* in Japan.

Kon, a race of *D. alata* in the neighbourhood of Bombay.

Konaghar and **Kanti konaghar**, for *D. esculenta* from Bombay to Ratnagiri.

Konda gummadu = hill gummadu, for *D. pentaphylla* in the Circars (Elliott).

Konda pendalam, a race of *D. alata* in the district of Ganjam, Circars.

Konta alu = thorny yam, for *D. glabra* generally in Orissa.

Kondap, a yam of N. Caledonia in the Voi and Ate languages.

Konuda, for *D. verans* in the Bojgyah language, Andaman Is.

Koppa kavalli = rubbish-heap yam, a race of *D. alata* and also applied to *D. bulbifera* in the Tanjore district, Madras.

Korani genasu, for nauseous *D. pentaphylla* in the district of Malabar, W. India.

Koregu pronounced **Korengu**, a race of *D. alata* in Fiji (Wright).

Kornapidan, for nauseous *D. pentaphylla* in the State of Travancore.

Kornmu, for *D. pentaphylla* among the Yeras of the Andaman Is.

Kosa kanda, a race of *D. alata* in the Raipur district.

Koto, a race of *D. alata* in Fiji (Wright).

Kou, for yam in N. Caledonia (de Lanessan).

Kowui, for yam in Solor Is. (van Lijnden). Cf. Kuwi, Khoai, as well as Owi.

Kowar, for *D. transversa* in Central Queensland.

Kozikan, for *D. oppositifolia* in the Buldana district, Central Provinces of India.

Kras kand, **Kras mati** or **Kiras mati**, for *D. oppositifolia* in the districts of Ilahangabad and Balaghat, Central Provinces of India.

Krin mrouk, for *D. Hamiltonii* in Arakanese, doubtless = Kayin myouk.

Krishna mati, for *D. oppositifolia* in the districts of Betul and Ilahangabad, and doubtless a distortion of the Gond name Krasmati.

Krits, **Kris**, **Krish**, **Krithi**, **Kins**, **Kithi** or **Kildri**, for *D. deltoidea* in Kashmir.

Kuari alu = queen yam, a race of *D. alata* in the Lakhimpur district of Assam.

Kubar or **Kupar**, a yam of N. Caledonia in the Voi or Ate languages.

Kudai kand, for *D. oppositifolia* in the Raipur district of the Central Provinces of India.

Kuduk = yam, in Sarawak among the Land-Dyaks (Chambers).

Ku gwa imo (Kou-kiu-imo), a Liu-kiu name for *D. esculenta*.

Kukare sanga, for *D. anguina* among the Kols in Chota Nagpur.

Kuku, a race of *D. alata* in Fiji.

Kukui, see Kukare.

Kukul alla = cock's yam, for *D. esculenta* in Ceylon.

Kukur alu = dog's yam, for nauseous *D. pentaphylla* and for *D. bulbifera* near Calcutta.

Kukur torul, for *D. sikkimensis* and *D. bulbifera* in Nepal.

Kukur poati = bitch's teats, for *D. esculenta* in the Darrang district of Assam. Cf. Rumpf's account of a similarly shaped yam in Amboina.

Kumaa, may perhaps be used in some of the Pacific islands for yam, but more properly indicates the Sweet Potato, *Ipomoea Batatas*. The word varies to Kumala and Umaa, etc.

Kumandioh, a yam of N. Caledonia in the Voi and Ate languages.

Kumiria alu, for *D. aculeata* in Chittagong.

Kumara baddu gumpa, said by Elliott to indicate in the Circars Wights "*D. aculeata*" which is *D. alata*.

Kunchong, for *D. bulbifera* in the Sikkim Himalaya.

Kundri, **Kondre** or **Kanri**, apparently a *Dioscorea* in Chota Nagpur which is eaten freely: the name becomes Kundru kanda in Raipur.

Kunjanga, for *D. bulbifera* in Queensland at Butcher's hill.

Kunti genasu, perhaps for *D. bulbifera* in Kanara, W. India, and meaning jasmine yam, just as Ubi malati does in Javanese.

Kuoi, **Kuoe** and **Ki-e** = yam, the first two among the Sakais of Perak and the last among the Sakais of Central Pahang. Cf. Khoai and Bakoi.

Kurda genasu godda, for *D. oppositifolia* in the Cuddapah district Madras. Cf. Kurudu.

Kuri = yam, in Tobu or Lord North's Island.

Kurijanga, for *D. bulbifera* in Queensland.

Kuru kand, i.e. **Karanda kand**, for *D. bulbifera* in the Nasik district, Bombay.

Kurudu, for *D. oppositifolia* in the neighbourhood of Mangalore, W. India (Metz. Hohenacker's collector).

Kurudu gaddi, or naasoon *D. pentaphylla* in the Madras Presidency.

Kurudu-pu, for *D. tomanosa* in the neighbourhood of Mangalore, W. India (Metz. Hohenacker's collector).

Kuru-kuru, a race of *D. alata* in Fiji (Wright).

Kurula alu, a race of *D. alata* in the Nowgong district of Assam.

Kushi, for edible *D. pentaphylla* in the Thana district, Bombay.

Kussok, for *D. pentaphylla* in the Sikkim Himalaya, see Kassok.

Kutabi, for yam in Sumba island = Katabi.

Kutanham, a yam of N. Caledonia in the Ate language, the same as Boutanheun.

Kuuroo or **Kuro**, for *D. chipsonioides* on the island of Yaeyama, Liukiu Is. The word suggests Quiroi.

Kuwi = yam, in the Watubela Is. of the Banda Sea. Cf. Huwi.

Kwai, a Talaing form of Kywe, q.v.

Kwinampai, a race of *D. alata* in the Philippine islands.

Kwinoro, a race of *D. alata* in the Philippine islands.

Kwci nang mo, for *D. hispida* in the Shan Hills, the first word being derived from Khoai.

- Kywe**, for *D. hispida* universally through Burma, the pronunciation being "chwe." It is Khoai = yam, applied to one yam only.
- Lae, Lahi** or **Lua**, for *D. pentaphylla* in the islands of Lihon and Buron (Rumpf).
- Lahan mati**, for *D. belophylla* in the Balaghat district of the Central provinces of India.
- Lakfui**, for various yams in Timor (Teij-mann). (cf. Laku.
- Laku**, for yam in Timor.
- Lakuda imo**, for a race of *D. opposita* in Japan.
- Lai** = red, a word of Persian origin, common in N. India, and in combination with ratalu (from rata the Sanskrit word for red and aluka = yam) interesting as showing the word "ratalu" to have lost the restricted application proper to it.
- Lai lambi ratalu** = long red ratalu, for a race of *D. alata* in the Rai Bareilly district, Gangetic plains.
- Lai phal alu** = red bulbil yam, for a race of the same in the Bankura district, Bengal.
- Lai ratalu** = red ratalu, in Western Hindi generally for *D. alata* with red flesh.
- Laliya kand**, for *D. anguina* in the district of Banda, Gangetic plains.
- Lame** or **Lami** = yam in Makassar where lamung means to plant, and in Buginese.
- Lameaju**, for *D. pentaphylla* in Celebes.
- Lamebutung**, a race of *D. alata*: cf. Butu.
- Lamechengka**, said to be for *D. esculenta*.
- Lamejava**. cf. Ubi java.
- Lamekamummu**,
- Lamekandora**,
- Lame tau**, a race of *D. alata*.
- Latar** or **Lataru**, not uncommon distortions of Ratar and Ratalu in the lower districts of the Gangetic plains.
- Lava**, recorded by Hazlewood as a race of *D. alata* in Fiji, but apparently an error.
- Lebeta**, for *D. pentaphylla* in the Hanuabada language of Papua.
- Lede**, for *D. hispida* in Bima.
- Lei**, for *D. hispida* in the Kei islands and in Wetan, of the Serwatti islands; probably the same word as Lac.
- Lega**, for *D. pentaphylla* in the island of Tutuila, Samoa.
- Lek ghar torul**, a race of *D. alata* in Sikkim. See Lowki ghar torul.
- Leko lamelame** = wild yams near Makassar, Celebes.
- Leliem**, for *D. hispida* among the Chins, Burma.
- Lima-lima** = fives, from the leaflets, a Tagalog name for *D. pentaphylla* and also for other closely allied species in Luzon. Like Ubi in the Philippine islands, it is Malay.
- Lin** = yam, in Dhirmal, N.-E. India.
- Lingurella**, a race of *D. alata* in Ceylon.

Llop, a yam of N. Caledonia in the Voi language, the yam that is called Tugui in the Ate language.

Loang-foan-pan, for *D. Bentharii* in Kwantung.

Lofika, for *D. heteropoda*, *D. trichantha* and perhaps for other species in the Sakalava language of Madagascar. See Hofika.

Lokaloka, a race of *D. alata* in Fiji with magenta flesh.

Lokheri, for *D. belophylla* and *D. oppositifolia* in the Belgaum district, and adjoining parts of the Bombay presidency.

Loli, for *D. bulbifera* on Mt. Abu, S. Rajputana.

Londi or **Lundi**, for nauseous *D. pentaphylla* in the country behind and to the north of Bombay.

Lowar, for nauseous *D. pentaphylla* in the Jabalpur district of the Central Provinces of India.

Lowki ghar torul, for a race of *D. alata* in Sikkim, a Nepali name.

Lua, for *D. alata* in Sumba Island, Banda Sea, or for *D. pentaphylla*. See Lae.

Luktu, an Ilugao name for *D. alata*, connected with Luttu.

Lum bok, a Dioscorea among the Lepchas.

Lurga, for nauseous *D. pentaphylla* in the Jabalpur district of the Central Provinces of India.

Lutu, for *D. alata* in Banda (Rumpf).

Luttu, an Ibanag name for *D. esculenta*, northern Luzon.

Macahiba, for bitter *D. Macahiba* in the Sakalava language, Madagascar.

Mach alu, **Mas alu**, **Machua alu** = fish yam, a race of *D. alata* or more than one race, in north and north-eastern Bengal.

Machranga alu = fish coloured or fish-relish yam, a race of *D. alata* in the Jessore district, Bengal.

Maciba or **Malita**, for edible *D. Maciba* in the Sakalava language, Madagascar.

Madhvaluka (sanskrit) = sweet yam, possibly for *D. esculenta* and the origin of Moa alu, and Mataru.

Maelan, in South Ceram for Aelan, q.v.

Maha kukul alu = big cock's yam, for a race of *D. esculenta* in Ceylon, but is not this "maha" from madh originally.

Maha paru valli codi = greatest (? longest) yam creeper, for *D. oppositifolia* in Madras; or "maha" from madh.

Mahal kanda = palace yam, a race of *D. alata* in the Raipur districts of the Central Provinces of India.

Mahoari, see Mau.

Mak hko hton, for *D. bulbifera* among the Shans.

Makoda, for wild *D. alata* in the Hanuabada language of Papua.

Malabalukbuk-dagis, for *D. nummularia* in Pampangan.

Malaka kaya pendalam = Malacca vegetable yam, for cultivated *D. bulbifera* in the Circars. The origin of the name is probably not in Malacca (for the Malay Peninsula) but in Moyyaku pendalam.

Malay kaya pendalam (Mukharji), for cultivated *D. bulbifera* in the ('ircars. The meaning is ob-scure, but perhaps from mallai = hill.

Malita (Sakalava), see Maciba.

Mallai kilangu = hill yam, for *D. bulbifera* in the Tanjore district or for edible *D. pentaphylla* in the Trichinopoly district, Madras.

Maloa, for *D. pentaphylla* in the Hauuabada language of Papua.

Mamba dokoro, a yam of Japan.

Mamo, for *D. hispida* in Bikol, Luzon.

Man, for tuber, but usually for *D. alata*, in Shan, though apparently not in Laos.

Man awn = small yam, a race of *D. alata*, in the Shan hills.

Man awn kwah = small plum yam, a race of *D. alata*, in the Shan hills.

Man hkak, a race of *D. alata*, in the Shan hills.

Man hkam, for a race of *D. alata* ? in the Shan hills.

Man khow wo = ox-horn yam, a race of *D. alata*, in the Shan hills.

Man leit kai = small egg yam, a race of *D. alata*, in the Shan hills.

Man lien, for *D. cirrhosa* in Laos, or more likely for a race of *D. alata*.

Man long or **Man lung** = red yam, a race of *D. alata*, in the Shan hills.

Man nam tow = goblet yam, a race of *D. alata*, in the Shan hills.

Man hing = bell yam, for *D. pentaphylla* or else *D. esculenta*, in the Shan hills.

Man kat = cold yam, for *D. hispida*, in the Shan hills.

Man kawng = drum yam, for *D. esculenta*, in the Shan hills.

Man nam or **Man nim**, for *D. decipiens*, in the Shan hills.

Man on, for *D. esculenta* in Laos.

Man tin mi = bear's foot yam, a race of *D. alata*, in the Shan hills.

Man ting sang = elephant's foot yam, a race of *D. alata*, in the Shan hills.

Man ting tow = turtle's foot yam, a race of *D. alata*, in the Shan hills.

Man yawn htan = cucumber yam, a race of *D. alata*, in the Shan hills.

Man ye in du, for *D. bulbifera* in the district of Akyab, Arakan.

Mandengen = yam, in Buru Island.

Mandengen boti, for *D. bulbifera*.

Mandengen meha, for *D. alata*.

Mangat, a Malayan word for yam or potato, perhaps usually *Ipomoea Batatas*.

Mangaya, **Mangiya**, **Muniya**, **Mungaya** or **Mengwa**, for *D. melanophyma* in the N. W. Himalaya.

- Mangri ghorkan**, a race of *D. alata* in the Ratnagiri district, Bombay.
- Manmour**, for *D. belophylla* in the district of Jhansi, Central India.
- Manokand**, for *D. bulbifera* in the district of Surat, Bombay.
- Maoli**, see *Mau*.
- Mao shu tin** = hairy tuber creeper, for a *Dioscorea* probably *D. kamoonsensis* in central China (Diels).
- Mao yu tse** = hairy arum, for *D. kamoonsensis* in the Chinese province of Szechuan.
- Mar pashpoli** or **Pashpoli** = deadly strangle cake or strangle cake, for *D. hispida* in the Bombay Ghats, though referred erroneously to *D. oppositifolia* (Graham).
- Mara keshango** = deadly keshango, said to be *D. pentaphylla* in Travancore, but *D. hispida* is more probable.
- Margodi gai** = rains yam, for *D. esculenta* among the Savaras of the Ganjam district, Circars.
- Maroda kanda**, for *D. alata* in the Raipur district of the Central Provinces of India..
- Maru dokoro** or **Maruba dokoro** = round (leaved) tokoro, for wild *D. bulbifera* in Japan.
- Mas alu**, see *Mach alu*.
- Masiha** or **Mosia**, for yam in Orissa.
- Mataru**, **Matharu**, **Matalu** and **Mataru kanda**, for several edible and cultivated yams in the Central Provinces of India, e.g. *D. alata*, *D. esculenta* and edible *D. bulbifera*.
- Matawai**, a race of *D. alata* in Fiji—a dubious name.
- Matawar kand**, for *D. bulbifera* in the Balaghat district of the Central Provinces of India, from Mataru.
- Matia alu** = earth yam, for *D. alata* in the district of Jalpaiguri, N. Bengal and southwards, abundantly to the mouth of the Ganges.
- Mati**, a Gondi word, see *Bhumia mati*, *Karulmati*, *Krasmati*, *Krishnamati*, *Lahanmati*, *Nanmati*, and *Poturumati*.
- Matoh**, a yam of N. Caledonia in the Voi and Ate languages.
- Mattu kilangu** = hard yam, a race of *D. alata* in the Trichinopoly district, Madras.
- Mau alu**, **Mohu alu**, **Moa alu**, **Mowa alu** = sweet yam, names for *D. esculenta* in Bengal and Assam from the sanskrit *Madhvaluka* and changed to *Mausari* and *Maoli* towards the centre of India.
- Mavondro**, for a *Dioscorea* thought to be *D. esculenta* in Betsimisiraka, Madagascar.
- Mayatbang**, for *D. luzonensis* in the Tagalog language, Province of Rizal, Luzon.
- Mbale-mbale**, Fijian pronunciation of *Bale-bale*, q.v.
- Mboka**, Fijian pronunciation of *Boka*, q.v.
- Mbotia**, Fijian pronunciation of *Botia*, q.v.
- Mecha bok**, a *Dioscorea* among the Lepchas of Sikkim.
- Melan** or **Maelan**, for *Aelan* in South C'eram.

Mengwa = Mangava.

Menje dzu, for *D. alata* among the Nagas.

Menjiri, for nauseous *D. pentaphylla* in Sylhet, Assam.

Merom tuar sanga = goat's milk yam, for *D. anguinu* and sometimes for *D. alata* among the Kols of Chota Nagpur.

Mina, for *D. rerans* in the Yera language of the Andaman Is.

Mitha kand = sweet tuber, for *D. oppositifolia* in the Saugor district of the Central Provinces.

Mithi alu = sweet yam, for *D. alata* in the districts of Bogra and Mymensingh, Bengal.

Mithi genthi or **Mithi gethi** = sweet genth, for cultivated *D. bulbifera* in the N.-W. Himalaya.

Mithi ratalu = sweet ratalu, for a race of *D. alata* in the Rai Bareilly district, Gangetic plains.

Mitua, a perfumed yam of N. Caledonia in the Ate language; the same as Aoui.

Mjarrah, for *D. transversa* on the Tweed River, N. S. Wales.

Moa alu, see Mau alu.

Moala, for a race of *D. alata* in Fiji. Can it be from Mau alu?

Mocha alu = yam like the flower cone of a banana-plant, for *D. pentaphylla* in the Mymensingh district, Bengal.

Mohan kand or **Mehona kand** = pleasant yam, for a race of *D. alata* and also applied to *D. pentaphylla* in the Akola district, Berar.

Moindah, a yam of N. Caledonia in the Voi and Ate languages.

Moiva, for wild *D. alata* in the Hanuabada language of Papua.

Mom alu or **Momna alu** = wax yam, for *D. alata* in the Central Provinces of India, a not uncommon name.

Momiji dokoro or **Momidi dokoro** = seven-point tokoro, for *D. septemloba* in Japan, in reference to the leaf.

Morsu kavalli = twining yam, a race of *D. alata* in the Tanjore district, Madras.

Mou-enne, a yam of N. Caledonia in the Voi language the same as Taqui oua.

Moyyaku pendalam, for cultivated *D. pentaphylla* in the Ganjam district of the Circars. It suggests Malaka kayu pendalam, but is differently applied, and suggests Muka keshango, which is similarly applied.

Mrouk, the Arakanese equivalent of Myouk.

Mua jhapra alu = sweet hairy yam, for cultivated *D. pentaphylla* in the Darrang district of Assam.

Mudi genassu, for a race of *D. alata* in Kanara, W. India.

Muka keshango or **Muka kacchel** = snout yam, for *D. bulbifera* in Travancore.

Muragada tega, for *D. esculenta* in the Vizagapatam district, Circars, probably from Margodi.

Mullu = thorny, in Kanarese and Tamil.

Mullu genasu = thorny yam, for *D. esculenta*.

Mullu kilangu = thorny yam, for several *Dioscoreas* including *D. esculenta*, but especially for *D. pentaphylla* in Travancore.

- Mullu pendalam**, said by Elliott to be *D. pentaphylla* in the Circars.
- Mullu valli kilangu** = thorny stick yam, commonly for *D. esculenta* in S. India.
- Mujib bok** = plum yam, for a race of *D. alata* in the Sikkim Himalaya among the Lepchas.
- Mukago**, in Japanese for the edible bulbils of *D. opposita*.
- Mun** = tuber, in Siamese, sometimes combined with Koi, q.v. and see Man.
- Mundia alu** = round yam, a race of *D. alata* in the Angul district, Orissa.
- Mungaya** or **Muniya**, see Mangaya.
- Muragada tega**, for *D. esculenta* in the Vizagapatam district, Circars, probably from Margodi.
- Murkanda**, for *D. oppositifolia* and for *D. belophylla* in the Bhandara district of the Central Provinces of India.
- Murom kacchel**, for edible *D. pentaphylla* in Travancore.
- Musillam valli kilangu**, for *D. esculenta* in the district of Tanjore, Madras.
- Muttaik kavalli** = thick yam, for a race of *D. alata* in the district of Tanjore, Madras.
- Mutur sang**, for *D. belophylla* among the Santals.
- Myouk**, in Burmese for *D. alata* as contrasted with all other species of Dioscorea, except in Myouk leik-u which also appears as Myit leik-u, and Myouk pwe-dok.
- Myouk eingdaing** = garden *D. alata*, general in Burma.
- Myouk gyi nwe lein**, for a race in the Shan States.
- Myouk gyin** = ginger *D. alata*, for a race in the Minbu district.
- Myouk gyi u** = big tuber *D. alata*, a race in the Shan States.
- Myouk hgnet**, a race in the Tavoy and Salween districts.
- Myouk hpa eing** = garden frog yam *D. alata*, for a race in lower Burma.
- Myouk kauk-hnyin-cheik** = glutinous *D. alata*, for a race in the districts of Tavoy and Mergui.
- Myouk khoung**, for a race in the district of Hanthawaddy.
- Myouk kya**, for a race in the districts of Salween and Tavoy.
- Myouk leik-u**, for *D. glabra* in Pegu district.
- Myouk long**, for a race in the district of Katha, N. Burma.
- Myouk ma**, for a race in the district of Katha, N. Burma.
- Myouk mwe-sout**, for a yam in the Kyaukse district.
- Myouk mwe zouk**, for a fragrant race grown in central Burma.
- Myouk nga-cheik** = sticky fish *D. alata*, a common name for a race in Lower Burma.
- Myouk ni** or **Myouk-u-ahni** = red *D. alata*, a common name in Burma.
- Myouk ni kun-pa**, for a race in the district of Mergui.
- Myouk ni kwam-ye**, for a race in the district of Mergui.

- Myouk nwa-gye**, for a race in Lower Burma with tuber shaped like an ox-horn.
- Myouk nwe**, a name recorded by Kurz for Lower Burma, and found in a Working plan for the Yonbin reserve in Pyinmana, ascribed to *D. glabra*, but its incidence not proved: however there is a Myouk-nwe in the Salween district which may be a small *D. alata*.
- Myouk nyo**, a yam of the Kyaukse district of great size, a race of *D. alata*.
- Myouk palin**, a race in the Akyab district.
- Myouk pha-aing**, a race in the Pegu district.
- Myouk sa**, a race sparingly cultivated in the Bassein district.
- Myouk shin**, for a race in the district of Tavoy.
- Myouk shin the**, for a race in the district of Myingyan.
- Myouk sin gyi don**, a race in the Henzada district.
- Myouk taing**, for a race in the district of Tavoy.
- Myouk thamein oh ahni**, for a race in Northern Arakan.
- Myouk the**, for a race in the Shan States.
- Myouk thin-u**, for a race in the district of Myingyan.
- Myouk thwe**, a name said to be used in the Toungu district as Myouk nwe is in Pyinmana.
- Myouk u-gnet**, for a race in Tavoy.
- Myouk u ni** or **Myouk u ahni** = red-tuber *D. alata*, a common name in Burma.
- Myouk u pyu** or **Myouk u ahpyu** = white-tuber *D. alata*, a common name in Burma.
- Myouk u sat**, a race in the Bassein district.
- Myouk ye-oh** = water-pot *D. alata*, a race in Upper Burma.
- Myouk yin**, a race in dry central Burma.
- Myaun ne myouk**, a race of *D. alata* in the district of Shwebo, central Burma.
- Myit-leik-u**, a doubtful name for *D. glabra* in lower Burma.
- Nachai kyu**, a Bhutanese name for *D. belophylla*.
- Nadu kaju** or **Nadu kachu**, for *D. esculenta* or *D. alata* in the Nilgiri Hills, Madras.
- Naga china**, a race of *D. alata* in the State of Sawantwadi, W. India.
- Naga dokoro** = long dokoro, for *D. Tokoro* in Japan.
- Naga imo** = long imo or yam, for an inferior race of *D. opposita* in Japan.
- Naga valli (kilangu)** = snake stick yam, a race of *D. alata* in N. Ceylon.
- Nagal kanda**, a race of *D. alata* in the Raipur district of the Central Provinces of India, and *D. oppositifolia* in Nimar and then the same as Nagweli kand.
- Nagali dumpa**, (Elliott) for a yam in the Circars.
- Nagweli kand**, for *D. oppositifolia* in the Akola district, Berar.
- Nai** = yam, among the Kachins.
- Nai chu-nai**, for a cultivated *D. pentaphylla*.

Nai hkai, for *D. glabra*.

Nai kalu, for *D. bulbifera*.

Nai labong, for a race of *D. alata*.

Nai n'byen or **Nai n'pyen**, for *D. pentaphylla*.

Nai neim krang, for a race of *D. alata*.

Nai pum, for a race of *D. alata*.

Nai tong or **nai tung**, for a race of *D. alata*.

Nai u-kung, for a race of *D. alata*.

Naisevu, a race of *D. alata* in Fiji (Wright).

Nakaan, a yam of N. Caledonia, in the Voi and Ate languages.

Nakago, in Japanese for the edible bulbils of *D. opposita*.

Nakoe, **Nakua** or **Nakwa**, for *D. tomentosa* or for *D. pentaphylla* in Chota Nagpur, the Mirzapur district and Baghelkhand.

Nala = yam in the Hawaiian Is. (Marblech).

Name or **Nami**, for *D. hispida* in the Tagalog language on Luzon and in Mindoro.

Namula, recorded as if for a race of *D. alata* in Fiji by Hazlewood, but probably in error.

Nan kand, a substitute for the next in the Bhandara district of the Central Provinces of India.

Nanmati, **Nandmati** or **Nanamati**, for *D. oppositifolia* and also for *D. belophylla* in the following districts of the Central Provinces of India,—Bhandara, Saugor, Narsinghpur, Hoshangabad; but in the districts of Balaghat and Hoshangabad also applied to *D. bulbifera*.

Nana kilangu = bamboo yam, for *D. esculenta* in the district of Malabar and the State of Travancore.

Nangri ghor kan, a race of *D. alata* in the district of Ratnagiri, Bombay.

Narenja, for *D. oppositifolia* in the Cuttack district, Orissa. Cf. Naringa.

Nare tagalu or **Nari tega** = fibre yam, for *D. aculeata* in the Vizagapatam district, Circars.

Nare genasu = fibre yam, for *D. aculeata* in Malabar district, Bombay.

Nari gaddi = fibre yam, for *D. aculeata* in the State of Travancore.

Nari imo, for cultivated *D. bulbifera* in Japan.

Naringa or **Nadanga**, for *D. tomentosa* in the district of Ganjam, Circars. Cf. Narenza.

Nat myouk, a race of *D. alata* in Northern Arakan.

Natt alu (Macmillan), as a name used in Ceylon.

Nattu kavalli, for *D. belophylla* in Malabar.

Nau-do, see Cu-nau.

Nau-non, a Dioscorea of Tonkin.

Nau-rua, a Dioscorea of Tonkin.

Ndamuni, Fijian pronunciation of Damuni, q.v.

Ndhe, a yam of N. Caledonia in the Ate language.

Needi kilangu = long-lived yam, a race of *D. alata* in the Malabar district, W. India.

Nemu, a race of *D. esculenta* in the Hanuabada language of Papua.

Neya, for *D. esculenta* on the Malabar coast (Rheede).

Nga-cheik myouk u = sticky fish yam, a race of *D. alata* in the Shan States.

Niga gashiu, for wild *D. bulbifera* in Japan.

Nika, for *D. esculenta* in the island of Guam, Mariana Is. If wild it is Nika commaron.

Niluvi pendalam = upright yam, a race of *D. alata* in the Circars.

Nin wei shao teng, ascribed with a query to *D. doryophora* by Rosthorn who obtained the name in central China.

Nise, a race of *D. alata* in Fiji (Wright).

Nomei or **Nomol** = yam in the Babar Is. of the Banda sea.

Note, a yam of N. Caledonia (de Lanesan).

Nuli = fibrous, for *D. tomentosa* in Travancore.

Nuli kilangu = fibrous yam, for *D. oppositifolia* in the Salem district of Madras.

Nulla ginni geddalu, for *D. bulbifera* in the Ganjam district, Circars.

Nulla godda, a Telugu name for *D. bulbifera* in the Chanda district of the Central Provinces of India.

Nulla goddalu, said to be a race of *D. alata* in the Cuddapah district, Madras, but doubtless a mistake.

Nulla sunna gudda or **Sunna gudda**, for *D. hispida* in the Warangal district of the Nizam's dominions.

Nulu tega or **Nulu dumpa** or **Nulu goddalu** = thread yam, for *D. tomentosa* in the districts of Godaveri and Cuddapah.

Nulvalli kilangu = thready stick yam, for *D. tomentosa* in the Salem district, Madras.

Nunetya, for *D. tomentosa* in the Ganjam district, Madras.

Nunmati, the name for *D. anguina* in the Saugor district, Central Provinces, and for some similar *Dioscorea* in the Narsingpur state.

Nuran kilangu, **Nureavan**, **Nurai genassu** or **Nurai kaju**, all meaning thready yam, for *D. pentaphylla* where Malayalam is spoken, or the last in the Nilgiri Hills.

Nuta genasu, for edible *D. pentaphylla* in the Malabar district, W. India. But is it correct?

Nuta kilangu, a race of *D. alata* in the Malabar district, W. India.

Nwe ye myouk u, a race of *D. alata* in Central Burma.

Obi = yam in Western Malaya, here and there and particularly in the island of Madoera.

Obi kasuaris, for a *Dioscorea* in Flores (Teijsmann).

Obi kembili, used in Flores and doubtless for *D. esculenta*.

Obi manusia, for a *Dioscorea* in Flores (Teijsmann).

Odorah alu, for nauseous *D. pentaphylla* in the district of Balasore, Orissa, probably from Addar.

Ofika or **Ofaka**, for *D. heteropoda* and *D. Hoffa* in the language of the Betsimisarakas and in Hova, Madagascar.

Ohu or **Ohuhu** = yam, in Flores, South Ceram and central Celebes and particularly for *D. bulbifera*. Cf. Abau.

Olo, for Kolokand as a name for *D. hispida* in the Soutal Per-
gunnahs.

Olor tuwo, for *D. Scortechinii* in the Simalur islands off Sumatra.

Ondo or **Ondot**, for *D. hispida* in Ceram, the Uliassers, and An-
boina.

Ondo kasturi = musk ondo.

Ondot-i-lawanan, in Menado, Celebes.

Oni dokoro = giant tokoro, for *D. Tokoro* in Japan.

Onombitio, a yam of N. Caledonia in the Ate and Voi languages.

Opou-ali, a yam of N. Caledonia in the Voi language.

Oppa, for *D. esculenta* in Buton (Rumpf) and as **Opa** in Buginese
and Makassarese.

Oria, for *D. oppositifolia* in Khandesh, Bombay.

Orot, for *D. hispida* in the Visayan language of Luzon, and ap-
parently the same word as Ondot. See Ondo.

Otiyal kacchel, a race of *D. alata* in Travancore.

Ouacoulouta, a yam of N. Caledonia in the Voi and Ate languages.

Ouitoupita, a yam of N. Caledonia in the Voi language.

Oundi, a yam of N. Caledonia in the Voi language.

Ovi or **Owi**, for U'bi in the Dyak language.

Owi bawoi, a Dyak name from S. E. Borneo ascribed to *D.*
oppositifolia and perhaps designating *D. nummularia*.

Owi behas, a Dyak name of S. Borneo for *D. bulbifera*.

Owi kulo, for *D. bulbifera* in North Celebes.

Owi suman, for *D. alata* among the Dyaks of S.-E. Borneo.

Ovi = yam, in the Hova language of Madagascar, equal to U'bi, and
including the potato.

Ovibe, for *D. seriflora*.

Ovifantaka, for *D. seriflora*.

Ovifotsy, for edible *D. seriflora* in the Sakalava language.

Ovifohty, for *D. seriflora*.

Oviharina, for *D. alata*.

Ovihazo, for, it is suggested, *D. ceylonensis*.

Ovi marika, for a *Dioscorea*.

Ovi tantry, for a *Dioscorea*.

Ovisangana, for a *Dioscorea*.

Ovinala, for *D. Orinda* in the language of Betileo or Ber-
simi-saraka.

Oyot weron, for *D. pubera* in Samarang, Java, and the same as
Werung.

Paa, for *D. pentaphylla* in N. Caledonia. Cf. Patara.

Pada valli gadde = going deep stick yam, for *D. brachophylla* in the
S. Kanara district, Madras.

Padri, for edible *D. pentaphylla* in Baghelkhand, Central India.

Padum bok, **Papum bok** or **Parum bok**, for a *Dioscorea* in the
Lepcha language of the Sikkim Himalaya.

Pahari ratalu = hill ratalu, a race of *D. alata* in the Rai Bareilly
and Allahabad districts, Gangetic plains.

Paharia phal alu = hill fruit yam, for *D. bulbifera* in the Bankura
district, Bengal.

Pagla alu = mad yam, for *D. bulbifera* in the Chittagong district.
Paicha alu, for *D. bulbifera* in the Mymensingh district, Bengal.
Pai shao = said to be for a cultivated race of *D. japonica* in China.
Pakit, a Tagalog name for *D. nummularia*, *D. divaricata* and *D. luzonensis*, perhaps also for *D. alata*.

Pakwit, see Pakit.

Pakzyok bok, a race of *D. alata* in the Lepcha language of the Sikkim Himalaya, perhaps for Pasok bok.

Palam bok or **Pu-um bok**, for *D. Hamiltonii* and *D. Wattii* among the Lepchas of the Sikkim Himalaya.

Palau = yam, in the Marquesas islands (Mosblech).

Palleru tega, a *Dioscorea* in the Circars (Elliott).

Pamir bok, for a *Dioscorea* among the Lepchas in the Sikkim Himalaya.

Pan alu, the same as Pani alu in the Mayurbhanj state, Orissa.

Panch mukhi alu = five snouts yam, a race of *D. alata* in the district of Angul, Orissa.

Panch mukhi pedalu = five snouted pedalu, a distortion of Pandi mukhi pendalam or pig's snout yam, received from Darjeeling to which district such a name does not actually belong.

Pandi mukha tega = pig's snout yam, for nauseous *D. pentaphylla* in the Vizagapatam district, Circars.

Pandra, a race of *D. alata* near Bombay.

Panggi = yam in the Sulu Is.

Panglang or **Pangla torul**, for *D. anguina* in the Sikkim Himalaya.

Pangaru = delicate yam, a race of *D. alata* in the Ranchi district, Chota Nagpur.

Pangil, for *D. bulbifera* among the Chins.

Pani alu, probably = Pan-leaf or Betle pepper leaf yam, for *D. oppositifolia*, *D. pubera* and *D. aculeata* in the districts of Angul, Balasore and Cuttack, etc., Orissa.

Pani torul, for *D. alata* and for *D. lepcharum* in the Darjeeling Himalaya, probably by distortion from Panu torul.

Panji kurudu, said to stand for *D. bulbifera* in the Madras Presidency.

Pannu kilangu, in the Anamallai hills for *D. bulbifera*.

Panpatica = betle leaf yam, for *D. oppositifolia* in the district of Balasore, Bengal.

Panu bok or **Panu torul**, for *D. belophylla* and for *D. alata* in the Sikkim Himalaya.

Panukelathun kacchil, for *D. alata* or *D. oppositifolia* in Travancore.

Panu kondal = wormy yam, for *D. bulbifera* in Southern Ceylon.

Papum bok, for a *Dioscorea* in the Sikkim Himalaya.

Paquit, see Pakit, Pakwit.

Par aru = superior yam, for *D. esculenta* in the Unao district, Gangetic plains.

Pari, a name for *D. Cumingii* in Bagobo, Mindanao.

Pari bok, a race of *D. alata* in the Sikkim Himalaya.

Pariya kanni, for *D. oppositifolia* in Travancore.

Parogai, for *D. glabra* among the Savaras of the Circars.

Pasok bok or **Pazok bok** = wild yam, for *D. belophylla*, *D. Hamiltonii* and probably other species among the Lepchas of the Sikkim Himalaya.

Paspoli, see Mar paspoli.

Pat alu or **Pata alu** = threshing board yam, a race of *D. alata* in Lower Bengal with flat tubers.

Patal konda, appears in the Report of the Bengal Department of Agriculture for 1886, as a yam.

Patara, **Paraara**, **Panara** or **Paanara**, for *D. pentaphylla* in Tahiti. The "Providence's" officers obtained the third form of the name in 1792.

Patha alu, for *D. pentaphylla* near Calcutta and towards Orissa.

Patti kacchal, for *D. bulbifera* in Travancore.

Paynut, recorded as a name for *D. flabellifolia* in Luzon.

Pazien bok = eccentric yam, a race of *D. alata* in the Sikkim Himalaya.

Pe dumpa, for *D. hispida* in the Vizagapatam district, Circars.

Pedgo, for *D. esculenta* in the Sontal Pergunnahs.

Pedra kanda = ? pigs yam, for nauseous *D. pentaphylla* in the Damoh district of the Central Provinces of India.

Pein-u, properly *Alocasia* in Burma, but sometimes mis-applied to a *Dioscorea* e.g. Pein myouk khoun (Kurz).

Pem bok = round yam, a race of *D. alata* in the Sikkim Himalaya.

Pen hru, for nauseous *D. pentaphylla* among the Chins. The name is possibly incorrect.

Pendalam, a Telegu word for yam and almost always for *D. alata*, obviously derived from the sanskrit Pindhaluka which in a most interesting way has given the word Pindi applied not to *D. alata* but to *D. esculenta*.

Pendi and **Pendia**, a form of Pendalam from Akola in Berar approaching Pindhi.

Peru mallai (kilangu) = large mountain yam, for *D. anguina* in Travancore and also for *D. alata*.

Peru valli kilangu = large stick yam, a race of *D. alata* in the Tanjore district Madras.

Pete, for *D. pentaphylla* in Hitua island (Rumpf).

Phal alu = fruit yam, for some *Dioscoreas* noticeable by their bulbs, e.g. *D. anguina* in the Birbhum district, Bengal, *D. pentaphylla* and races of *D. alata* widely where Hindi, both eastern and western, are spoken.

Phaleo bok, a *Dioscorea* among the Lepchas.

Phan = yam, in the Khasia language.

Phan dukalah, a wild yam.

Phan garo = garo yam, a race of *D. alata*.

Phan jar, a cultivated yam.

Phan jugan, a cultivated yam.

- Phan klau** = wild yam, races of *D. alata*, wild in the Khasia hills, or perhaps for *D. melanophylla*.
- Phan kthang**, bitter yam, for *D. bulbifera*.
- Phan kyrsiu** = helper or deliverer yam, for edible *D. pentaphylla* or for cultivated *D. bulbifera*.
- Phan kyrsiu somthiah**, for edible *D. pentaphylla*.
- Phan lakhar**, for *D. bulbifera*, meaning yam with leaves like the lekhar-tree.
- Phan lengar**, a race of *D. alata*. Lengar is a place name.
- Phan lyngkhi** = solitary yam, for *D. bulbifera* or *D. hispida*.
- Phan lyngshaw** = gourd shaped yam, for a race of *D. alata*.
- Phan mluh** = salt (coloured) yam, either for *D. alata* or *D. esculenta*.
- Phan pylleng** = egg yam, for *D. bulbifera*.
- Phan rain** = grudging or dwarf yam, for *D. Hamiltonii*.
- Phan saw** = red yam, for a race of *D. alata*.
- Phan shriew** = cachew-like yam, for a race of *D. alata*.
- Phan shynreh** = buffalo or big yam.
- Phan skong** = bamboo yam, for *D. glabra*.
- Phan solak** = potato yam, for *D. hispida*.
- Phan solak kthang** = round potato yam, for edible *D. bulbifera*.
- Phan sujab**, for *D. pentaphylla*.
- Phan suri** = wolf's yam, for a race of *D. alata*.
- Phan tangkara** = flat spreading yam, a race of *D. alata*.
- Phan tem** = yellow yam, for a race of *D. alata*.
- Phan thiang**, = sweet yam, for a cultivated *Dioscorea*.
- Phan thied** = root yam, for *D. glabra*.
- Phan til**, a race of *D. alata*.
- Phan tieng** = wooly yam, for an unidentified *Dioscorea*.
- Phan um** = water-yam, for *D. assamica*.
- Phar**, in Tirhut, for Ratalu, q.v.
- Phararu, Phorawa**, or **Phararwa** = bulbil yam, for bulbil-bearing *D. alata* in the districts of Darbhanga, Bhagalpur, Garo, Geta plains, and Ranchi, Chota Nagpur.
- Phurui** = yam, in the Mikir language, in compounds abbreviated to Rui, q.v.
- Pidi thumpa**, for *D. belophylla* in the Vizagapatnam district, Circars.
- Pidi kanda**, a *Dioscorea* in the Raipur district.
- Pilita**, for *D. pentaphylla* in Samoa. (L. Piritu).
- Pindaluka**, for a *Dioscorea* in sanskrit, either for a race of *D. alata* whence the application of the word Pindalam or for *D. esculenta* whence the words Pindhalu, Pindhi, Pirhi, Pendi, etc.
- Pindhalu, Pindhi** or **Pendi alu**, for *D. esculenta* commonly in the Central Provinces of India, and thought to arise from the tubers being of the same size as the little cakes called pendi, but doubtless really from Pindaluka.
- Pindi parimi baddu**, a name for a yam in the Circars (Elliott).

Pinot, for *D. nummularia* in the Tagalog language.

Pintur, a word of the north of Celebes ascribed to *D. hispida*, *Mucuna reticulata* and an *Ipomoea*, plants which have nothing in common but a climbing habit. Therefore it is to be asked if it does not mean "climber."

Piralu, perhaps for *D. pentaphylla* under the Sikkim Himalaya.

Pirhi, equivalent to Pindi in the Jahalpur district of the Central Provinces of India.

Pirieh bok or **Piriyeh bok**, for wild *D. alata* in the Sikkim Himalaya.

Pirsi or **Persa**, for *D. oppositifolia* in the Belgaum district, W. India.

Piska or **Pisika**, for *D. bulbifera* generally among the Sontals.

Pistalu, for *D. alata* in Dacca, Bengal.

Pita alu = bitter yam, the common Uriya name for *D. bulbifera*.

Pit kanda or **Pith kanda** = bitter tuber, for *D. bulbifera*, and applied also but not reasonably to *D. oppositifolia*, in the Raipur district of the Central Provinces of India.

Pita masia, the same as Pita alu.

Pitasi, for *D. bulbifera* in Singbhum.

Pitharu = bitter yam, for *D. aculeata* in the Ranchi district, Chota Nagpur.

Poconta, a yam of N. Caledonia in the Voi and Ate languages.

Poda alu or **Pada alu** = flat yam, a race of *D. alata* in the Chittagong district.

Podavi kelangu, given by Rheede as *D. hispida*, but very similar names are used for other wild yams e.g. Pada valli gadde for *D. belophylla* and Poturu mati for *D. anguina*.

Podhali valli kilangu = deep-growing stick yam, for *D. oppositifolia* or some very similar yam in Ceylon.

Polog, a race of *D. alata* in the Philippine islands.

Pologon, see Pulugan.

Pora alu, said to mean burnt yam, from the method of cooking, for *D. esculenta* in Chittagong. The name is close to Pura alu.

Poti kelangu, for *D. esculenta* in Malabar, W. India.

Poturu mati, for *D. anguina* in the Hoshangabad district of the Central Provinces of India.

Pouan, a yam of N. Caledonia in the Voi and Ate languages.

Pua-uhi = yam, in the Marquesas Is. (Christian). Cf. Paa.

Pua-uhi kua = red yam, doubtless *D. alata*.

Pua-uhi maoi = white yam, doubtless *D. alata*.

Pua-uhi peai.

Pua-uhi tea.

Puari alu, for a race of *D. alata* in the Darrang district, Assam, possibly the same as Puraia alu.

Puati, a Dioscorea of Sylhet, see Kukur-puati.

Puducheri valli kilangu = Pondicherry tuber plant, a race of *D. alata* in the districts of Cuddapah and Chinglepet, Madras.

Pugang, a race of *D. alata* in the Philippine islands.

Puli mora dumpa, for a Dioscorea in the Circars (Elliott).

Pulugan, Pologan or Pugang, a name for *D. bulbifera* in Bikol and Visayan.

Punda mohra gudda = pig's snout yam, for nauseous *D. pentaphylla* in the Chanda district of the Central Provinces of India.

Puno-oh bok, for a race of *D. alata* among the Lepchas with a long very large purple-fleshed tuber.

Pura alu = ? big yam or else = Puraia alu, a race of *D. alata* in the Bogra district, Bengal and the Darrang district, Assam.

Puraia alu = ? post yam, a race of *D. alata* in the Nowgong district, Assam.

Puraia fesuka alu, a race of *D. alata* in the Nowgong district, Assam.

Purang bok, a race of *D. alata* among the Lepchas.

Puri bok or Purung bok, a red fleshed race or races of *D. alata* in the Sikkim Himalaya.

Puti dumpa or Puti sara, for *D. hispida* in the Vizagapatam district, Circars, and also referred to *D. bulbifera*.

Quimanpu, for *D. alata* in Cebu, Philippine Is. (Blanco).

Quiroi, Quireot or Quiroe, for *D. divaricata* and *D. myriantha* in the Tagalog language of Luzon. The first syllable suggests Khoai.

Quru quru, a race of *D. alata* in Fiji (Wright).

Rabet, applied to *D. bulbifera* and *D. pentaphylla* in Madoera island.

Rabet abua, to *D. bulbifera*, cf. Abau.

Rabet abubu, to *D. pentaphylla*.

Rabet bangkat, to *D. pentaphylla*.

Rabet elos, to *D. pentaphylla*.

Rabet pangkat, for a race of *D. pentaphylla*.

Rabet sosyan or Rabet soseyan, to *D. bulbifera*.

Rabi or Ravikand, for *D. oppositifolia* in the Balaghat and Bilaspur districts of the Central Provinces of India.

Radraksha pendalam = Elaeocarpus seed yam or necklace yam, for *D. bulbifera* in the Circars (Elliott).

Raht alu = red yam, said to be *D. bulbifera* in Chittagong.

Raja alla = princely yam, a race of *D. alata* in Ceylon.

Raja alu = princely yam, a race of *D. alata* in Darrang district, Assam.

Raja Mohan dumpa = Raja Mohan's yam, for a Dioscorea in the Circars. Cf. Mohan kand.

Raja valli kilangu, a race of *D. alata* in North Ceylon. Cf. Raja alla.

Rakta alu = red yam, for *D. alata* in the Bhagalpur district, Gangetic plains.

Raktaluka = red yam (sanskrit), doubtless for *D. alata* with red sap.

Rakto garania alu = red penetrating yam, for a race of *D. alata* about Calcutta. See *Garania alu*.

Ranahak, for *D. Hamiltonii* among the Kukis of the hills of N. Cachar, Assam.

Rani begur, for *D. pentaphylla* in the Sikkim Himalaya.

Rarepin, for *D. alata* in eastern Malaya.

Rata kondol = foreign yam, a race of *D. alata* in Ceylon. The name however Moon quotes as Ratakodol and seems to assign to *D. bulbifera*, probably in error.

Rata vel alla = foreign stick yam or red stick yam, for a race of *D. alata* in Ceylon.

Ratalu, from Raktaluka q.v., and indicating nowadays, the meaning of the first syllable having been forgotten, *D. alata* whether with red sap or without, wherever Hindi is spoken. Outside the region of Hindi southwards the name is sometimes applied to *Dioscoreas* other than *D. alata* e.g. *D. aculeata* in the Betul district or *D. anguina* in the Hoshangabad district. Ratalu in Behar varies to Ratar, Atar, Latar, Kathar and Phar; but Kathar does not come like the others from it direct but from Kathaluka.

Ratar or **Rataru**, are forms of Ratalu used in the districts of Gorakhpur, Champaran, and Shahabad, Gangetic plains, always for *D. alata*.

Ratoa alu, a race of *D. alata* in the Sontal Pergunnahs.

Ratha aru, used (? misused) for *D. glabra* in the Ranchi district, Chota Nagpur.

Ratha alla, a race of *D. alata* in Ceylon.

Ratna alu, for a race of *D. alata* in Gangpur State, Chota Nagpur.

Rato torul = red yam, for *D. alata* with red sap in Nepal.

Rausi, for a race of *D. alata* in Fiji.

Rausi kula, a race of *D. alata* in Fiji (Wright).

Rausi vula, a race of *D. alata* in Fiji (Wright).

Rauva, for *D. Seemannii* in Fiji (Wright).

Rayungshoie, for *D. assamica* in North Cachar.

Re = yam among the western Nagas. Cf. **Rui**.

Re-ozen, for *D. assamica*.

Re-pre piri, for a race of *D. alata*.

Rerepin, for *D. alata* in the Tounsea dialect of Menado, Celebes.

Ribe alu, for nauseous *D. pentaphylla* in the Balasore district, Orissa.

Ribsoni kand, for *D. bulbifera* in the Jhansi district of the Central Provinces of India.

Roflu, Ruglu or Ruklu, for *D. hispida* among the Lepchas of the Sikkim Himalaya.

Rui - abbreviated from Phurui = yam in the Mikir language of the Nowgong district, Assam.

Rui-chin = walking stick yam, a race of *D. alata*.

Rui-dok = savoury yam, *D. arachidna*.

Rui hang, for nauseous *D. pentaphylla*.

Rui labong = banana-bunch yam, a race of *D. alata*.

Rui oyath, for *D. glabra*.

Rui ping or **Rui peng**, for *D. pentaphylla*.

Rui re, for *D. anguina*.

Rui ring = ? bluish yam, for *D. assamica*.

Rui-un = capable yam, for either *D. lepecharum* or *D. glabra*.

Rui vat, for *D. Hamillonii*.

Sabalavu, a race of *D. alata* in Fiji (Wright).

Saeva kand or **Saira kand**, for *D. hispida* in the Betul district of the Central Provinces of India, and as Suor kand for nauseous *D. pentaphylla* in the Saugor district. See Sur alu.

Safed ratalu = white ratalu. See Ratalu.

Sahasra mukhi alu = thousand snouted yam, a race of *D. alata* in the district of Cuttack, Orissa.

Sahdwe-u, for Tahdwe-u, q.v.

Sahe = yam, in Borneo at Ukit (Moulton): cf. Sayawu.

Sakharua, **Sakhowa** or **Sankaru**, for *D. alata* in the Sontal Pergunnahs and apparently from Sankaluka.

Sakkara valli (kilangu) = sweet stick yam, a race of *D. alata* in the Tanjore district, Madras.

Sambong tulang = mend bones, a name quoted by Rumph as equalling daun bisol.

Samiya, for *D. anguina* in the district of Jhansi.

Samoan, **Samowan** or **Samwan**, for *D. pentaphylla* in Bali Island, with the following recorded as races.

Samoan jae = ginger samoan.

Samoan nasi = rice samoan.

Samoan sambuk.

Sampit = yam at Malohkalis in Borneo (Moulton).

San yao, a form of Shan yao, q.v.

San-yu, a form of Shan yu, q.v.

Sana ghar torul = small garden yam, the Nepali equivalent of the Lepcha's Bok kap, a race of *D. alata* in the eastern Himalaya.

Sanga = yam, particularly the yams good to eat, in the Kol language of Chota Nagpur. **Sang** in Sontali.

Sanga kuria alu, a race of *D. alata* in the district of Darrang, Assam, the same as Haljukia alu.

Sangia alu = heavy or bulky yam, a race of *D. alata* in the district of Jessore, Bengal.

Sanglal = red sanga, a hybrid name for red *D. alata* in the Sontal Pergunnahs.

Sanjukera, a race of *D. alata* in the Darrang district, Assam; also as Surja kera, q.v.

Sankaru or **Sakhowa**, a race of *D. alata* in the Sontal Pergunnahs.

Sankhaluka, (sanskrit) a Dioscorea, probably *D. alata*.

Sapang, for *D. pentaphylla* in the Visayan language, Philippine islands.

Saplai, for *D. hispida* in the Kotah State, Central India.

Saru, for *D. esculenta* in the Nadroga language of Fiji (Wright).

Sat-bhaya alu = seven brothers yam, a race of *D. alata* in the Balasore district, Bengal.

Satik kavalli = nutmeg yam, for *D. bulbifera* in the Tanjore district, Madras.

Satni, met with in the Bogra district for Sutni.

Sayawu, Sayafu, Sayabu, Sayahu, Sayahul, Siyau, Siyaou, for *D. esculenta* in Celebes and in Ternate, and the Moluccas.

Sayuwu rintek = small sayuwu.

Sayuwu sela = large sayuwu.

Seapa, for *D. hispida* in Celebes about Macassar.

Sebu, a race of *D. alata* in Fiji (Wright).

Sedre, pronounced Sendre, for a race of *D. alata* in Fiji (Hazlewood and Seemann), but in error.

Seem kwati, said to be *D. oppositifolia* in the Poshangabad district of the Central Provinces of India. Mati is probably in the second word.

Semal kand = Bombax yam or cotton-tree yam, said to be used in the Nimar district of the Central Provinces of India for *D. belophylla*, but probably an error.

Senali kilangu, for edible *D. pentaphylla* in the Madras Presidency.

Senka, said by van den Burg to be a name for a Dioscorea.

Senrh, Serh or Siar, for *D. anguina* in the district of Jhansi, centre of India.

Sepp or Seppy, for cultivated *D. bulbifera* in Japan.

Sharbutra kanda, for *D. bulbifera* in the Raipur district of the Central Provinces of India.

Shan yao, literally = hill or jungle medicine, the Chinese name primarily it would seem for those species of Dioscorea whose tubers are used medicinally, but extended to those which serve as foods. *Huai shan yao* is said to be the shan yao from Huai-cheng (a town in Shensi), and is prepared in the provinces of Shensi, Honan, Chili, Hupeh and perhaps elsewhere. But can it not be from Khoai q.v. Shan yao t'ou is said to be broken Shan yao from the second, third and fourth of these provinces. Chien shan yao is prepared in the provinces of Kwantung, Fukien, Hupeh and Szechuan. The exact botanical sources are unknown. Shan-yao tsai of Formosa is *D. japonica* var. *officinalis*.

Shan yu, = hill or jungle colocasia, often used in the place of Shan yao especially for the edible species of Dioscorea such as *D. Batatas*. As this Dioscorea is neither wild nor anything like a Colocasia, the application is extraordinary, though well vouched for.

Shan-yu-tsai, see under Shan-yao.

Shatavelli, used in parts of the Bombay presidency for Shendwel q.v.

Shaval kelangu, in the Anamallai hills for *D. bulbifera*.

Sheeni valli kelargu = sugar stick yam, but the first word is probably connected with Shendwel; it is a name from Ceylon.

Shendwel, Shendowel or **Shendorvail**, commonly used for edible *D. pentaphylla* in the districts of Satara and Belgaum, Bombay presidency.

Sher kand or **Sherkandi** = tiger's yam, for nauseous *D. pentaphylla* in the Bhandara district, Central Provinces of India.

Shi genasu, for a *Dioscorea* in Kanara, W. India.

Shimo bok, the same as Chimeo tendeo bok, q.v.

Shingli, for *D. delloidea* in Kulu, N.-W. Himalaya.

Shisen imo, a race of *D. opposita* in Japan.

Shora alu, a common name for *D. glabra* near Calcutta.

Shoro valli kilangu = gourd stick yam, for *D. esculenta* in North Ceylon.

Shu = yam or tuber in Chinese, whether edible or not.

Shu lang or **Shu liong**, for *D. rhipogonoides* and *D. cirrhosa*.

Shu pin = tuber sprouts, for a *Dioscorea* (Matsumura).

Shu tow = tuber head, for *D. opposita* (Giles).

Shu yao = tuber medicine, said to be *D. japonica* (Matsumura).

Shu yu = tuber Colocasia, for *D. opposita*, *D. alata* and the "*D. sativa*" of Bretschneider, which is probably *D. opposita*.

Siaho, Siaffu, Siavu and **Sahu**, for *D. esculenta* in Amboina and Banda and Ternate, cf. Sayawu.

Siar, for *D. anguina* in the district of Jhansi, centre of India. See Senrh.

Siddhiu bok, Siddhu bok, Siddihu bok or **Siddhu-u bok** or **Sindu bok**, for *D. esculenta* among the Lepchas in the Sikkim Himalaya.

Sikapa, Siyapa or **Sikapang**, for *D. hispida* in Celebes among the allied Buginese and Makassarese = Scapa. It is changed to Sikari in Bali.

Sikari, for *D. hispida* in the island of Bali.

Sikri alu = root yam, for a *Dioscorea* in the district of Dinajpur, Bengal.

Simbha, the bitterest *D. bulbifera* known to the Lepchas.

Simpat, see Kaching simpat.

Sim-shu = heart tuber, for *D. bulbifera* in Formosa (Henry).

Sinanto, a race of *D. alata* in Luzon, Philippine Is.

Sin che myouk, Burmese for a race of *D. alata* in the Shan States.

Singul bok, for *D. bulbifera*, *D. belophylla* and *D. lepchurum* among the Lepchas in the Sikkim Himalaya.

Sinthe, a doubtful name for *D. pentaphylla* in the Darjeeling district, Sikkim Himalaya.

Sirka alu = vinegar yam, but probably from the sanskritic root sur = to hurt, for nauseous *D. pentaphylla* in the Midnapur district of Bengal.

- Siru kilangu** = small yam, for *D. esculenta* in the south of India and in Ceylon: also as Siru valli kilangu.
- Sisi dumpa**, for *D. bulbifera* in the Vizagapatam district, Circars.
- Siyapu**, for *D. esculenta* in Hahmaheira.
- Siyau**, for *D. esculenta* in the island of Loda.
- Sizu bok**, for Siddhiu bok, q.v.
- So, Sod, Suk** = yam, among the Pangan and among the north Sakais of the Siamese-Malay States and into north Pahang; but mostly applied to the sweet potato, *Ipomoea Batatas*.
- Soda alu**, for *D. Kalkapershadii* in the State of Mayurbhanj, Orissa.
- Soi**, used in Samoa for Itoi, q.v. (Safford).
- Soka alu**, a wild *Dioscorea* of the Darrang district, Assam, where it is eaten to some extent.
- Solomoni**, a race of *D. alata* in Fiji (Wright).
- Somemomo imo**, used by Japanese botanists for *D. rhipogonoides*.
- Son duoc**, a name given for *D. persimilis* or for a race of *D. alata* by Loureiro. Son means mountain.
- Soni valli kavalli** = torrent stick yam, for a race of *D. alata* in the district of Tanjore, Madras.
- Sosi**, a race of *D. alata* in Fiji (Wright).
- Soso**, for edible *D. Soso* in the Sakalawa language of Madagascar.
- So-um bok**, a Lepcha name for a *Dioscorea*.
- Sounda** or **Souda**, for a *Dioscorea* probably *D. nummularia* in east Java and in Bali.
- Su**, yam in Tankin, and apparently the same word as khoai. The French write it Cu.
- Su-kai**, a race of *D. alata*.
- Su-kai-mo**, a race of *D. alata*, and the same as Khoai-mo.
- Su-kok-gian**, a race of *D. alata*.
- Su-nao** and **Su nao-do**, for *D. cirrhosa*.
- Su mai**, for *D. persimilis* or for a race of *D. alata* in Tonkin.
- Su-o-giong** or **Su-o-rong** = dragon's nest yam, for a race of *D. alata* in Tonkin.
- Su-tu** and **Su-tu-trang**, for *D. esculenta*.
- Suaria alu** or **Suareh alu**. See Sur alu.
- Subba dumpa**, given by Elliott as for *D. tomentosa* in the Circars.
- Sukdi babra**, for nauseous *D. pentaphylla* in the Melghat, Berar.
- Suker alu** = pig's yam literally but undoubtedly from the sanskritic root sur = to hurt, for nauseous *D. pentaphylla* and *D. bulbifera* near Calcutta. See Sur alu.
- Suku** = yam at Manyan, Borneo (Moulton).
- Suli bok** = inferior yam, for an edible variety of *D. pentaphylla* which grows in the Sikkim Himalaya, in the Lepcha language.
- Sumri**, for nauseous *D. pentaphylla* in the Jabalpur district of the Central Provinces of India, doubtless of common origin with the name Sur alu.
- Suna genasu** = lime yam, for a *Dioscorea* in Kanara, W. India.
- Sunna gudda**, for *D. hispida* in the Warangal district of the Nizam's Dominions.

- Sung bok** or **Su-om bok**, for *D. anguina* among the Lepchas in the Sikkim Himalaya.
- Sungul bck** or **Surger bok**, *D. belophylla* or an allied plant among the Lepchas.
- Suor kand**, for nauseous *D. pentaphylla* in the Saugor district.
- Supnor kanda**, a form of *Sur kanda* from the Rumpur district of the Central Provinces of India.
- Sur alu**, **Suar alu**, **Suaria alu**, **Svareh alu**, for nauseous *D. pentaphylla* and for *D. bulbifera* widely in Bengal, having their origin in the sanskritic root *sur* = to hurt.
- Sura alu** or **Suri alu**, for nauseous *D. pentaphylla* widely, the first where eastern Hindi is spoken, the second where western Hindi is spoken, i.e. from the borders of Bengal to the borders of Bombay.
- Surendi kand**, for nauseous *D. pentaphylla* in the Bilaspur district, Central Provinces of India,—a form of the above.
- Surja kera**, by distortion for the race of *D. alata* called also Haljukia.
- Surka**, for nauseous *D. pentaphylla* in the Jhansi district in Central India. Cf. *Sur alu*.
- Suta alu** = thread yam, for nauseous *D. pentaphylla* in the Angul district, Orissa, and also for *D. lomentosa* in Orissa. Sometimes for *D. oppositifolia*.
- Sutia kand**, for *D. oppositifolia* in the Akola district, Berar.
- Suthna** (Buchanan-Hamilton), mentioned as a Behari name contrasting with the next.
- Suthni alu**, a very well known Behari name for *D. esculenta* of unexplained derivation, the use of which, torul being substituted for alu, extends into Nepal. It has been suggested that the name refers to the cultivation being without supports.
- Swa-uh**, Hokkien for Shan yu, q.v.
- Swa yo**, Hokkien for Shan yao, q.v.
- Swinzi myouk**, a race of *D. alata* in the district of Salween, Burma.
- Ta-**, for yam in Cachari = Tha in Garo, etc. and sometimes also in Cachari.
- Ta-iyung**, for *D. alata* in North Cachar.
- Ta-misi** or **ta-mshi**, for nauseous *D. pentaphylla*.
- Ta-rem**, for *D. Hamiltonii*.
- Ta-shep**, for *D. anguina*.
- Tabulatawa** (pronounced Tambula tawa), a race of *D. alata* in Fiji.
- Tach imo kadsura** or **Tachi dokoro** = slender kadsura yam or slender tokoro, for *D. gracillima* in Japan.
- Tachi dokoro** = slender yam for *D. gracillima* in Japan, alluding to stems.
- Taguhetti**, a yam of N. Caledonia in the Voi language.
- Tah-dwe u** = letter "d" yam, a widely used name for *D. esculenta* in Burma, said particularly to be descriptive of a race with

lobed tubers: but it is difficult to rest satisfied with this explanation of the name.

Tah-dwe letwa = palmate tah dwe, a race of *D. esculenta* in the Tavoy district.

Taisei imo, used by Japanese botanists for Formosan *Dioscorea opposita*.

Tai shu = big yam, used in China for the yams which serve as food e.g. *D. opposita* and *D. alata* and perhaps also *D. japonica*.

Taitukava, a race of *D. esculenta* in the Haniabada language of Papua.

Takaru, for *D. hispida* in the Chanda district, Central Provinces of India.

Takasago tokcro, a name given by Japanese botanists to *D. doryophora*.

Takob or **Taku**, for some particular Yam, among the Pangan and Semang of the Siamese-Malay States and Kedah,—a name which Blagden thinks may have come from an old Negrito language.

Talbada, a race of *D. alata* in the Surat district, Bombay.

Tali babounji = crackling string, a name given by Rumpf for *D. nummularia*, for another species and for some species of *Vitis*.

Tali cupang = coin-rope, for *D. nummularia* in Amboina (Rumpf). Rumpf writes it Taly cupan. The name refers to the leaves.

Talis, for some edible root among the Semang, usage uncertain.

Talri, for *D. belophylla* in the Simla Hill States, N.-W. Himalaya, a form of Tarri, q.v.

Tamalia, for *D. oppositifolia* in the Cuttack district, Orissa, erroneously as Tambulai alu in Jajpur, Cuttack.

Tamalo, said to be used for *D. bulbifera* in the Katha district, Burma.

Tamis, a race of *D. alata* in Luzon in the Visayan language.

Tamra, a race of *D. alata* near Bombay.

Taniela, races of *D. alata* in Fiji (Wright).

Taniela danu = red taniela.

Taniela vula = white taniela.

Tanneh, a yam of N. Caledonia in the Voi and Ate languages, the same as Tha-ate.

Tanoa, a yam of N. Caledonia in the Voi and Ate languages.

Tapouar, a yam of N. Caledonia in the Voi and Ate languages.

Taqui oua, a yam of N. Caledonia in the Ate language the same as Mouenne.

Tarar, **Tarari** or **Tarri**, a Pahari word widely used along the N.-W. Himalaya as equivalent to Yam. It most commonly indicates *D. belophylla* and *D. alata*. Eastwards it changes into Tarur and then into Torul, q.v.

Tarur, the Central Pahari form of Tarar, indicating yam in the Himalaya of Dehra Dun, Almora and Naini Tal. (har tarur = domestic yam, is *D. alata*; Ban tarur or wild yam

is generally *D. belophylla* and *D. pentaphylla*; *D. bulbifera* having its special appellation Genth, is excluded.

Taung keor myouk, a race of *D. alata* in the Akyab district, Arakan.

Taw = wild, in Burma.

Taw kadat = wild kadat, for nauseous *D. pentaphylla* in the Akyab district, Arakan.

Taw myouk = wild *D. alata*, generally through Burma for *D. alata* persisting from cultivation or for *D. Hamiltonii*; also received from the Andaman islands attached (? by a convict) to *D. rexans*.

Taw myouk kawng, used not by Burmese, but by Burmese-speaking Karens in the Salween district for *D. pentaphylla*,—an usage that a Burman would not admit.

Taw thinba u, literally wild foreign yam, i.e. wild cassava, for *D. aculeata* in the Akyab and Kyaukpju districts, doubtless from the length of the tuber.

Tawi, for a yam among the Senoi of upper Pahang.

Tega = climbing plant in Telegu.

Tega dumpa, for *D. alata* in the Godavari district, Madras, or for *D. tomentosa*, in the Nagpur district of the Central Provinces of India.

Tega pendalam, for *D. alata* in the Nellore and Tanjore districts of Madras.

Teguna, a well known name for edible *D. pentaphylla* all along the Himalaya from Almora and Naini Tal to above Champaran.

Teinha, a yam of N. Caledonia in the Voi and Ate languages.

Teko imo = lever yam, a race of *D. opposita* in Japan.

Tella gini geddalū, for *D. hispida* in the Ganjam district, Circars.

Tella sunna gudda, apparently *D. hispida*, in the Nizam's Dominions.

Tena, Teona or Teoni, commonly in Eastern Hindi and Behari indicates edible *D. pentaphylla*; once met with as Tewna. Probably connected with Teguna.

Tena genasu = edible yam, for *D. alata* in South Kanara, S. W. India.

Tepta alu = ? flat yam, for edible *D. pentaphylla* in the Malda district of Bengal.

Tete, for yam in the Manggarai language of western Flores.

Tha = yam, in Bodo, Assam.

Thabalchu, for *D. esculenta* among the Garos.

Thaja, for *D. anguina* among the Garos.

Thaijong, for *D. alata* among the Garos.

Thaireng, for a race of *D. alata* in the Nowgong district.

Tha-kun, for a wild edible yam among the Garos.

Thakin, for a wild edible yam among the Garos.

Thamatchi, for *D. esculenta* among the Garos.

Thanairang or Thanairoh, for *D. assamica* in Cachar.

Tha-ate, a yam of N. Caledonia in the Voi language.

Thadut-ni, Thadut or **Thadot**, an unidentified wild tuber of Lower Burma, well known to the Burmese however, possibly *D. decipiens*.

Thana kacha, received from Madras as indicating edible *D. pentaphylla*.

Thara aru, for a race of *D. alata* in Gangpur State, Chota Nagpur.

Thavai kachchu or **thavai kaju**, for *D. oppositifolia* in the Nilgiri hills.

The myouk, for *D. glabra* in the district of Tavoy, Tenasserim.

Thella sunna gadda, for *D. hispida* in the district of Chanda, Central Provinces of India. Cf. Nulla sunna godda.

Themban, a race of *D. alata* in Travancore.

Thi-ang-dam, a Dioscorea of Tonkin, equal to Nau-rua.

Thi-ang-day or **Thi-ang-dia**, a Dioscorea of Tonkin, equal to Nau-non.

Thikona alu, a wild yam of the Darrang district, Assam.

Thin-douk u, a common Burmese name for *D. decipiens*.

Thin on u, for *D. esculenta* in the districts of Myingyan and Pakokku, Burma.

Thin gyat, for *D. assamica* in the district of Sandoway, Arakan.

Thuja, for *D. anguina* among the Garos. Cf. Tha.

Thuli kacchal, for *D. bulbifera* or for *D. esculenta* in the district of Malabar and the State of Travancore.

Thuri, Aitchison gave this for *D. ? belophylla* at Hoshiarpur. Cf. Tarar.

Ti, a Fijian word for yams not yet well explained: perhaps = sprout.

Ti-vou, vou indicates new growth; and so ti-vou is a very young yam.

Ti voli, said to stand for *D. Seemannii*, Voli alone indicating a race of *D. alata*.

Tiagandioh, a yam of N. Caledonia in the Ate language, the same as Taguhetti.

Tie-on-chao, recorded as a name for *D. Collettii* in the Chinese province of Yunnan.

Tikae, a yam of N. Caledonia in the Voi and Ate languages.

Tikani, for *D. esculenta* in the Sontal Pergunnahs.

Tikaosivaro, a race of *D. alata* in Fiji (Wright).

Tikari or **Takaru**, for *D. hispida* in the Chanda district of the Central Provinces of India.

Tikau = yam, superseding Uvi in some Fijian dialects.

Tilo carandi, for edible *D. pentaphylla* in S. W. India (Rheede).

Tin hpew u, for a race of *D. alata* in the Shan States, a hybrid name.

Tinukue, a race of *D. alata* in Luzon, with recurving tubers.

Ti-oman, a yam of N. Caledonia in the Voi and Ate languages.

Tira, yam at Krokong, Sarawak (Moulton).

Tiragali pendalam or **Tiragada pendalam**, for a yam in the Circars (Elliott).

Tis = yam, in the Tounsawang dialect of Minahassa.

- Tis pawatoan** or **Tis pawatohan**, probably for *D. nummularia*.
- Titl gethi** = bitter genth, for wild *D. bulbifera* through the N.-W. Himalaya. See Genth.
- Tiva tega**, **Teva tega** or **Tippa tega** = wild yam, for nauseous *D. pentaphylla* and also to some extent for other species of *Dioscorea* in the Vizagapatam district, Circars.
- Tivou**, (misspelled tivvu by Seemann) and **Tivoli**, see Ti.
- Tiwan**, for edible *D. pentaphylla* in the Gorakhpur district, Gangetic plains.
- Toganiwakaya**, a race of *D. alata* in Fiji (Wright).
- Tokatolu** or **Kaile tokatolu**, for *D. pentaphylla* in Fiji.
- Tokoro** or **Dokoro**, indicates the *Dioscoras* of the section *Stenophora* in Japan.
- Tokuro kadsura**, for *D. quinqueloba* in Japan (Leiden herbarium), the first word is tokoro or dokoro.
- Tongo** or **Tungo**, for *D. esculenta* in Luzon, forms of Tuqui used by the Tagalog.
- Topondon**, a yam of N. Caledonia in the Ate language, the same as Toundoo-onn.
- Toralia**, for *D. anguina* in the Hoshangabad district of the Central Provinces of India.
- Torul** = yam, in Nepal. See Tarar.
- Toundoo-onn**, a yam of N. Caledonia in the Voi language the same as Topondon.
- Towo**, for *D. hispida* or *D. pentaphylla* in Bhutan.
- Tsai-mey-tse**, recorded as a name for *D. Collettii* in the Chinese province of Kwei-chow.
- Tsie chou hoa**, recorded for *D. melanophyma* in Yunnan, China.
- Tsjageri nuren (kilangu)** = sweet fibrous yam, (Rheede) applied to *D. pentaphylla*, var. *Rheedei*, a cultivated variety.
- Tsu** = tuber in Chinese. Tsu-uh and Tsu-guh are quoted by Matsumura as names for *D. japonica*, see Shu.
- Tsu pre pyadzu**, for *D. bulbifera* among the Nagas.
- T'u-uh** = ground arum, for *D. bulbifera* in Chinese (Matsumura).
- Tsukne imo** = crushed yam, for a superior race of *D. opposita* in Japan, the tuber of which is short, like the crushed foot of a Chinese lady.
- Tu-su** (Tu 'u), for *D. esculenta* in Indo-China.
- Tual** = yam, in Tenimbar Island.
- Tubayan**, a race of *D. alata* in Luzon.
- Tugi**, **Tugui**, **Tuqui**, **Dogue**, **Toguing**, **Tungo** or **Tongo**, well-known names for *D. esculenta* in the Tagalog and Ilocano languages of Luzon. Sometimes, it appears, they may be misapplied to *D. alata*; and perhaps that is how there comes to exist a name Tugupulu = red tugui, although red *D. esculenta* is unknown, but it is noteworthy nevertheless that Rumph describes a red *D. esculenta*. The word Tugui has reached N. Caledonia and is in the Ate language, but it is uncertain how it is applied.

Tukjhok, for *D. kamoonsensis* among the Lepchas in the Sikkim Himalaya.

Tuma, said to be nauseous *D. pentaphylla* in the Vizagapatam district, Circars.

Tuma genasu, a race of *D. alata* in South Kanara, S. W. India.

Tumangai, for *D. aculeata* among the Savaras in the Circars, cf. Tuma.

Tumuktok, a race of *D. alata* in Luzon, with recurving tubers.

Tunga gudda, for *D. aculeata* in the Chanda district of the Central Provinces of India, used as Tunga alu in Orissa, and Angul and as Tungam sanga by the Kols in Singbhum.

Tungam sanga, for *D. aculeata* among the Kols, cf. Tuma.

Tungo or **Tongao**, see Tugui.

Twinzauk myouk = going straight down yam, for *D. Hamiltonii* and deep rooting races of *D. alata* in Tavoy and Mergui, Tenasserim.

U is tuber in Burmese.

U-myin-u, stated to be used in the Tharrawaddy district for a wild Enantiophyllous Dioscorea.

Ual or **Uar**, for *D. esculenta* at Balade and Yate respectively, N. Caledonia.

Ubag, said to be used for a race of *D. alata* in Luzon, and more certainly for *D. luzonensis* and *D. divaricata* in Tagalog, sometimes as Ubag manahan. Cf. Kobag.

Ubai, for Ubi in Sarawak.

Ubai tunku = prince's yam, for a yam in Sarawak.

Ubi = yam in Malaysia widely. It appears as Hubi as well as Ubi in the Sakai language; and occurs as Ubi from Sumatra to Sarawak, west Java, Celebes, the Moluccas, the Philippine islands (in most of the languages of the Christian tribes) and to N. Caledonia, mixed with other words for yam east of the Malay Peninsula. In Sarawak it is changed in places into Ubih, Ube, Ubei and Ubai. The "b" becomes "v," and it is Uvi in Fiji and Uve in Sarawak. The "b" may become "w" and it is Huwi in Sundanese generally though also Uwi; it is Uwi also in Celebes, and in N. Zealand where Uwhi occurs also (Williams). The "b" becomes "f" sometimes in Rotti and N. Caledonia and gives Ufi: so also in Tahiti. The "b" becomes "h" and the word is Uhi in various parts of Celebes, and in the islands east of Celebes, the Moluccas, and in Tahiti. In Rotuma along with Uhi occurs Uh. Uke and Uki are recorded by Moulton as occurring in Sarawak. The first letter is changed to "o" sporadically through the western parts of Malaya, and seems to particularly to be so in Madoera. Ovi and Ove occur in Sarawak; and Ovi may replace Uvi in south-east Borneo; while Ove occurs in Gajoland, North Sumatra and in Sarawak.

Ubi ajag, for a race of *D. alata* in Java.

Ubi akas, for *D. hispidu* in Perak.

- Ubi arah** (arah is a fig), for *D. hispida* among the Sakais.
- Ubi arit** = sickle yam, a race of *D. alata* in Java.
- Ubi aung**, a race of *D. alata* in Java and once seen applied to *D. esculenta*.
- Ubi ayam** = fowl's yam, from the red flesh perhaps, a race of *D. alata* in Java.
- Ubi babua**, for *D. alata* in Amboina (Rumpf).
- Ubi badak** = fan yam, for a race of *D. alata* in Java.
- Ubi badigul** = twin yam, for a race of *D. alata* in Java.
- Ubi bajari** = finger yam, for a race of *D. alata* among the Malays of the Moluccas.
- Ubi banteng** = Banteng's yam, for a race of *D. alata* in Java.
- Ubi blichik** = insipid yam, for an edible variety of *D. bulbifera* in Java.
- Ubi boaya** = crocodile yam, a race of *D. alata* in Java.
- Ubi bontal** = ball-yam, for *D. bulbifera* in the Malay of Amboina.
- Ubi bulong** = blue yam, a race of *D. alata* in Java, or for Ubi butong.
- Ubi buah** = fruit yam, for cultivated *D. bulbifera* in Java.
- Ubi butong** = a race of *D. alata* in Java, or *D. alata* in general. See Bulu.
- Ubi butul**, for *D. esculenta* in Java.
- Ubi calebassa**, described by Rumpf as if a race of *D. esculenta* which it can hardly be.
- Ubi chabuk**, for a race of *D. pentaphylla* in the Residency of Java. The Sakai word Jabbet is suggested by this name.
- Ubi china** = China yam, for *D. bulbifera* (de Clerq) in Malay.
- Ubi chuchuk** = snout yam, a race of *D. alata* in Java.
- Ubi chiabet**, see Jabbet.
- Ubi da-are**, for *D. bulbifera* in Halmaheira.
- Ubi dago**, for *D. alata* in the Philippine islands (Kamel) being tautological. See Daga.
- Ubi dasawala**, a race of *D. alata* in Halmaheira.
- Ubi elos**, commonly for *D. alata* in eastern Java and Madoera.
- Ubi gadis** = virgin yam, but evidently in error for Gadong, for *D. hispida* among the Bataks, Sumatra.
- Ubi gadog**, a race of *D. alata* in Java.
- Ubi gadung** and **Ubi gadueng**, for *D. hispida* in the Malay Peninsula and in Menangkabau, Sumatra: but Gadung is expressive enough by itself.
- Ubi gede** = big yam, a race of *D. alata* in Java.
- Ubi gendola** = red yam, a race of *D. alata* in Bali.
- Ubi hahipiang**, a race of *D. alata* in Celebes, Bantik district in Minahas-a.
- Ubi haliya** = ginger yam, a race of *D. alata* in Amboina.
- Ubi heulang**, a race of *D. alata* in Java.
- Ubi hidung** = snout yam, a race of *D. alata* in Java.
- Ubi ipit**, for *D. bulbifera* in Bali.
- Ubi jabbet**, for *D. pentaphylla* among the Sakais. See Jabbet.

- Ubi jahe** = ginger yam, a race of *D. alata* in Java and a race of *D. esculenta*.
- Ubi jantong** = male yam, a race of *D. alata* in Java. Cf. Ubi butong.
- Ubi jarar**, a yam among the Bataks, Sumatra.
- Ubi jari** = finger yam, a race of *D. alata* in Java.
- Ubi jawa** = Java yam, a race of *D. alata* in the Malay Peninsula, and in Java.
- Ubi jububug**, for *D. bulbifera* in Java.
- Ubi junjong** = pole yam, a race of *D. alata* in the Malay Peninsula.
- Ubi kalebasa** = Calabash yam, a race of *D. alata* in eastern Malaya.
- Ubi kapur** = chalk yam, a race of *D. alata* in Java.
- Ubi kastela** = Castile yam, for *D. bulbifera* in Singapore.
- Ubi kamayong** and **Ubi kawayong jahe** = benzoin yam and benzoin ginger yam, for *D. filiformis* or some deep rooting yam in Java. The same name as Akar keminiyan. Also applied to *D. esculenta*.
- Ubi kayu** = stick yam, means tapioca always in western Malaya, but said in north Celebes to be used for *D. hispida* (assuredly a mistake).
- Ubi kelibang** = the *Artocarpus lanceaefolia* yam, a race of *D. alata* in Malaya, the tuber lobed as an *Artocarpus* leaf.
- Ubi kelona** = the milax yam, for some wild *Dioscorea* in Malaya.
- Ubi kenduduk** = yam, purple in colour like senduduk fruit (*Melastoma malabathricum*), a race of *D. alata* in Singapore.
- Ubi kepler sampi** = penis boxis yam, a race of *D. alata* in Java.
- Ubi kiara**, a race of *D. alata* in Java.
- Ubi kipas** = fan yam, a race of *D. alata* in Malay.
- Ubi klapa** = coconut yam, a race of *D. alata* in Java.
- Ubi klapa molis**, a race of *D. alata* in Java fruit yam.
- Ubi klesih** = ? extruding yam, a race of *D. alata* in Bali.
- Ubi klinting**, for a race of *D. esculenta* in Banjoemas, Java.
- Ubi kuja** = Indian merchant's yam (from *khuwajah*, a master or rich merchant, a name in Malaya for Indian merchants) a race of *D. alata* in Java.
- Ubi kulo**, for *D. bulbifera* in eastern Malaya.
- Ubi kumili utan** = wild kombili yam, for *D. bulbifera* in Malacca (Alvins).
- Ubi kurubut** = group yam, a race of *D. alata* in Java.
- Ubi lakilaki** = male yam, a race of *D. alata* with long tubers in Malaya (? where). Cf. Butu.
- Ubi landak** = porcupine yam for *D. esculenta* in Java.
- Ubi likit** = glutinous yam, a race of *D. alata* in Java.
- Ubi lilin** = wax yam, a race of *D. alata* in Java.
- Ubi lubang** = hole yam, a race of *D. alata* in Java.

- Ubi mangindano** = Menado yam, from Menado in Celebes, ascribed to *D. pentaphylla* locally in Celebes.
- Ubi manis** = sweet yam, a race of *D. alata* in Java.
- Ubi menjangan kuning** = yellow deer yam (the deer being *Cervulus muntjac*), a race of *D. alata* in Java.
- Ubi menjangan merah** = red deer yam, a race of *D. alata* in Java.
- Ubi menjangan putih** = white deer yam, a race of *D. alata* in Java.
- Ubi manusiya** and **Ubi manusiya merah** = human yam and red human yam (from the shape), races of *D. alata* in north Celebes.
- Ubi mengari** = curry yam, a race of *D. alata* in Java.
- Ubi merah** = red yam, races of *D. alata* in Singapore and in north Celebes.
- Ubi naga** = dragon yam, a race of *D. alata* in Java.
- Ubi nasi** = rice yam, a race of *D. alata* in Singapore or for *D. alata* in a general way.
- Ubi ondo**, for *D. bulbifera* in Celebes. See Ondo.
- Ubi opang**, ascribed to *D. esculenta* in Java.
- Ubi orai**, a race of *D. alata* in Java.
- Ubi pagar** = fence yam, a race of *D. alata* in Java.
- Ubi paha kerbau** = buffalo-thigh yam, a race of *D. alata* in the Malay peninsula.
- Ubi pandang** = Pandanus yam, for a race of *D. alata* in the Malay Peninsula.
- Ubi priaman** = Priaman yam, from Priaman in Sumatra, for *D. pentaphylla* in Ternate (Rumpf).
- Ubi pasir** = sand yam, for *D. pentaphylla* in Java and also similarly applied by Sakais in the Malay Peninsula (Ridley).
- Ubi patok** = bill of bird yam, a race of *D. alata* in Java.
- Ubi putih** = white yam, a common Malay name for *D. bulbifera* and as Uwi putih in north Celebes with the same application.
- Ubi radhin**, for *D. alata* in Madoera.
- Ubi rame** = big yam, a race of *D. alata* in Java.
- Ubi rembu** = ? post yam, probably for a race of *D. alata*, in the Malay Peninsula.
- Ubi sabut** or **Ubi sawut**, for *D. hispida* and *D. pentaphylla* in Java, and perhaps also for *D. polyclades* (Zollinger).
- Ubi salaki** = twin yam, a race of *D. alata* in Java.
- Ubi salamprit**, a race of *D. alata* in Java.
- Ubi sekok**, a race of *D. alata* in the Malay Peninsula.
- Ubi senggani**, a race of *D. alata* in Java.
- Ubi seneur** = the Senhor's yam, a race of *D. alata* in Java.
- Ubi sisising**, a race of *D. alata* in Java.
- Ubi sukun** or **Ubi daun sukun**, the yam shaped like the leaf of the Bread-fruit tree, a race of *D. alata* in eastern Malaya.
- Ubi susug** = milk yam, a race of *D. alata* in Java.

- Ubi tanduk** = horn yam, a race of *D. alata* in Java.
- Ubi tangan** = hand yam, a race of *D. alata* in Java, and the Moluccas.
- Ubi tanjong** = headland yam, an unidentified yam eaten by the Semangs of the Malay Peninsula (Blagden).
- Ubi taun-taun** or **Ubi tahun-tahun** = yearly yam, a race of *D. alata* in eastern Malaya and possibly also *D. pentaphylla* (Rumpf).
- Ubi tirai**, for a yam in Sarawak (Moulton).
- Ubi tiyang**, a race of *D. alata* in Java.
- Ubi torak** = ? spool yam, a race of *D. esculenta* in the Malay Peninsula.
- Ubi torana**, the same as Ubi taun-taun.
- Ubi tropong** or **Ubi trobong** = pipe yam, a race of *D. alata* in Singapore, but ascribed wrongly perhaps to *D. esculenta* in Java.
- Ubi tumpuk** = group yam, a race of *D. alata* in Java.
- Ubi upas** = poison yam, for wild *D. bulbifera* in Java.
- Ubi ular** = snake yam, a race of *D. alata* in Malaya.
- Ubi utan** = jungle yam, for several wild yams through the Malay region here and there e.g. *D. pentaphylla*, *D. Blumei*, *D. hispida*, *D. glabra*, etc.
- Ubi utang**, for a *Dioscorea* in Banda.
- Ubich**, among the Land Dyaks of Sarawak for Ubi, q.v.
- Ubing-basol**, for *D. nummularia* in the Tagalog language, Luzon.
- Ubi-ubihan**, a name for *D. bulbifera* in Tagalog. The reduplication suggests that it is applied to a race with many or conspicuous bulbils, and possibly one of the edible races.
- Uchiwa dokoro** = fan yam, for *D. nipponica* in Japan, alluding to leaf.
- Udella** or **Uda alla** = top-side yam, for cultivated *D. bulbifera* in Ceylon, its aerial bulbils being the food and not the terrestrial tuber.
- Ufi**, variant of Ubi, used in Tahiti.
- Ufi hoi**, for *D. esculenta* and *D. bulbifera*.
- Ufi mene-mene**, for a race of *D. alata*.
- Ufi opura**, for a race of *D. alata*.
- Ufi paparatea**, for a race of *D. alata*.
- Ufi patara**, for *D. pentaphylla*. (cf. Patara).
- Ufi taho-taho**, for a race of *D. alata*. (cf. Ubi tahun-tahun).
- Ufi tiauu**, for a race of *D. alata*.
- Uh**, in Chinese unqualified for *Colocasia esculenta*, but qualified denotes various esculent tuberous plants, and as Swa uh or Shan-yu, indicates various *Dioscoreas*.
- Uh** = yam, in Rotuma and Uhi also in Rotuma and in Salayer and Amboina. See Ubi.
- Ujla machalu** = bright fish yam, a race of *D. alata* in the Sontal Pergumahs.
- Ujla ratalu** = bright ratalu, a race of *D. alata* in the Tnao district, Gangetic plains.

Ulibita or **Uhulibita**, for *D. hispida* in the Moluccas.

Ulitholi kacchel, a race of *D. alata* in Travancore.

Ulshi, for edible *D. pentaphylla* in the district of Thana, Bombay.

Umaa = yam, in the Marquesas Islands, a form of Kumaa.

Umi genasu, for a *Dioscorea* in Kanara, W. India.

Unaniya kham alu, a race of *D. alata* in the Bankura district, Bengal.

Unar sanga, for *D. belophylla* and *D. glabra* among the Kols of Singhbhum.

Un-kau-tou, a Chinese name for *D. bulbifera* (Diels).

Un-tok, the same.

Undai kavalli = globose yam, for *D. hispida* in the Tanjore district Madras.

Unka alu, a race of *D. alata* in the Sontal Pergunnahs and the districts of Hazaribagh and Ranchi, Chota Nagpur.

Un-woo, a Queensland (Red Island) name for *D. bulbifera*.

Upka aru, a race of *D. alata* in the district of Ranchi, Chota Nagpur.

Urlaha = yam in the Aru islands.

Urulai kilangu = globular yam, a common Tamil name for the potato which is sometimes misapplied to the Dioscoreas.

Uththate kacchel, a race of *D. alata* in Travancore.

Utong-utongan, a name for *D. bulbifera* in Tagalog, Luzon, perhaps used like Ubi-ubihan.

Uvi, for Ubi in Fiji, but restricted to *D. alata*.

Uvi kaboa, a race of *D. alata* in Fiji.

Uvi kaluwo, a race of *D. alata* in Fiji.

Uvi ni vavalagi (pronounced uvi ngi vavalagi) = foreign yam, a race of *D. alata* in Fiji (Wright).

Uvi ni gau (pronounced uvi ngi gau), for a race of *D. alata* in Fiji, but in error.

Uvi ni vutuna (pronounced uvi ngi vutuna), a race of *D. alata* in Fiji (Wright).

Uvi votuna, said to be a race of *D. alata* in Fiji, but the name appears more appropriate to *Colocasia esculentum* (Wright).

Uwi, chiefly in Javanese, for Ubi, q.v.

Uwi abang = red yam, a race of *D. alata* in Java.

Ubi alas = jungle yam, for *D. hispida* and for *D. nummularia* in Java.

Uwi alus = slender yam, a race of *D. alata* in Java.

Uwi badak = fan yam, a race of *D. alata* in Java.

Uwi chayu, said to be for *D. hispida* in north Celebes, but can it be for tapioca?

Uwi cheker = handful yam, a yam of Java.

Uwi churuk, a yam of Java.

Uwi dudung, said to be *D. hispida*; but cf. Butu.

Uwi gadung, for *D. hispida* in Java.

Uwi intuwa, **Uwi intuwa rintek** and **Uwi intuwa alus**, ascribed to *D. glabra*, but belonging perhaps to *D. nummularia* in north Celebes.

- Uwi kawayong** = benzoin yam, doubtless for *Dioscorea pyrifolia*, in Java.
- Uwi klapa** = coconut yam, for *D. bulbifera* in the Batavia Residency of Java.
- Uwi laka** = red yam, for a race of *D. alata* in north Celebes.
- Uwi labang** = red yam, for a race of *D. alata* in Java.
- Uwi lilin** = wax yam, for a race of *D. alata* in Java.
- Uwi putun**, for *D. alata* in Java. (f. Butu.
- Uwi paturi** = princess' yam, for *D. pentaphylla* in Java.
- Uwi putih** = white yam, for a race of *D. alata* in Java.
- Uwi raindang**, a race of *D. alata* in north Celebes.
- Uwi sawut jahe**, for *D. hispida* in Java.
- Uwi senggani**, a race of *D. alata* in Java.
- Uwi sayavu**, for *D. esculenta* in North Celebes.
- Uwi tutung**, for *D. hispida* in Java; but see Butu.
- Uwi upas** = poison yam, for *D. bulbifera* in Java.
- Uwi wilus**, a race of *D. alata* in Java, the same as Ubi alus.
- Uwhikaho**, for yam in N. Zealand when grown to supply the ships between 1820 and 1845. (f. Uvi, and cf. Kau and Kau-maile.
- Uyalla** = thread yam, for *D. tomentosa* in Ceylon.
- Vainur tega**, for *D. hispida* in the Vizagapatam district, Circars.
- Vaj**, see Waj: it occurs also in the Surat district as Vaj-no-kand or Vaj-kand.
- Vale**, a name said to belong to *D. aculeata* in the State of Travancore, perhaps Valli torn from Kilangu.
- Van aru**, for *D. anguina* in the Bhandara district of the Central Provinces of India.
- Vara kilangu** = wild yam, for *D. bulbifera* and *D. aculeata* in Travancore.
- Velliala valli kilangu**, recorded as a name for *D. oppositifolia* in the Kallimalai hills, Madras.
- Velwa**, a race of *D. alata* in Fiji (Wright).
- Venni kilangu** = twining yam, for *D. bulbifera* in the Malabar district and for *D. alata* and *D. Hamiltonii* in the State of Travancore.
- Verri pendalam**, a race of ? *D. alata* in the Circars.
- Vetti lai valli kilangu** = betel-leaf yam, a very widely used name for *D. alata* through southern India, but sometimes used for other species, e.g. for *D. spicata* in Travancore and for *D. oppositifolia* in the Salem district.
- Vitua** = yam in the Nadroga language, Fiji (Wright).
- Voli**, a race of *D. alata* in Fiji. Ti-voli differs.
- Volikula**, a race of *D. alata* in Fiji (Wright).
- Vor khdnoc**, for *D. hispida* among the Khmers in Cochin China (Pierre). Do khdnoc is given by the same botanist also.
- Vurai**, a race of *D. alata* in Fiji.
- Vurai tabua** (pronounced Vurai tambua), a race of *D. alata* in Fiji, the name requiring verification.

Vypa dumpa, for nauseous *D. pentaphylla* in the Godaveri district, Madras.

Wadan = yam, in the Watubela islands of the Banda Sea.

Wadu dang, for *D. esculenta* among the Kachins of Burma.

Wainisucu, a race of *D. alata* in Fiji (Wright).

Waj, Waz or Vaj, for *D. hispida* in southern Rajputana and the neighbouring districts of Bombay and also sometimes for *D. bulbifera*.

Waka dua, a race of *D. alata* in Fiji.

Wakat (waccat), recorded by Rumpf as indicating a race of *D. pentaphylla* in Bali.

Wakmato, for *D. esculenta* in the Northern Shan States.

Waloini = yam, in the Sermata islands of the Banda Sea.

Wardi, for *D. oppositifolia* in the Melghat, Berar.

Wari lottu lottu, according to Rumph an amboinese equivalent for Tali babounji.

Warran, for *D. hastifolia* in Western Australia.

Ware, a yam of N. Caledonia in the Ate language, the same as Oundi.

Wat-wek, for *D. Hamiltonii* on the Pichoung, Arakan, among the Chins. Cf. Wet-we.

Wel alla, a race of *D. alata* in Ceylon.

Werung or Werungan, Kerung or Gadungan, for *D. pubera* and *D. polyclades* in Java, the first in the Residencies of Paseroean, Samarang and Pekalongan, the last two in the island of Madoera.

Wet-ka u = pig cut off yam, for *D. esculenta* in central Burma.

Wet ma u = sow yam, for *D. esculenta*, perhaps in error for Wet ka u; but the resemblance of the tuber to a sow is sometimes evident. Cf. Kukur poati.

Wet yan u, for the same in the Kyaukse district, Burma.

Wet-we, for *D. alata* or some other *Dioscorea* among the Chins of the Gangaw valley in the Pakokku Chin hills. Cf. Wat-Wek.

Wi, yam, in Java perhaps imported, as an abbreviation of Iwi.

Wi-ka, for *D. bulbifera* in Queensland on the Morehead river.

Wili, Wiwi and Wiwiwak = yam in New Guinea, N. Celebes and the Aru islands.

Wilus, sometimes stands alone in the place of Uwi wilus for *D. alata*, and if this is a well established usage then another interpretation of Ubi wilus than slender yam is to be found. Leschenault a century ago recorded the name as "*ubium willous gonou*."

Wingao, Winto or Wintog, for *D. laurifolia* in north Celebes.

Wi sudo, for *D. esculenta* in east Java, and evidently connected with Sunda or Suda, q.v.

Wiwi or Wiwiwak, see Wiwi.

Wohiu, for yam in Solor.

Wokai, *D. bulbifera* at Cooktown, Queensland.

- Xan yo**, Loureiro's spellug of Shan yu. q.v.: recorded by him as for *D. persimilis* or for a race of *D. alata*.
- Yama imo** or **Yama no imo** = hull yam, for *D. japonica* in Japan.
- Yarisi**, a race of *D. alata* in Fiji (Wright).
- Yarisi damu**, a race of *D. alata* in Fiji (Wright).
- Yarisa vula**, a race of *D. alata* in Fiji (Wright).
- Yeh-shu** = wild tuber, for *D. japonica* in Chinese (Henry).
- Yella gaddalu**, for edible *D. pentaphylla* and for *D. tomentosa* in the Cuddapah district.
- Yella gadda**, for *D. oppositifolia* in the districts of Kurnul and Cuddapah, Madras, and in the Nizam's dominions.
- Yu** is *Colocasia antiquorum*, but qualified by Shan stands for *Dioscorea* in Chinese.
- Yu than**, a name for a race of *D. alata* recorded by Loureiro as Chinese.
- Ywel**, see Aywel.
- Zaminkand**, that is earth tuber, for *D. hispida* sometimes in the Kotah and Gwalior States, but the name really belongs to *Amorphophallus*.
- Zembu**, for cultivated *D. bulbifera* in Japan.
- Zenka**, for *D. esculenta* in Celebes (Rumpf): van den Burg spells it Jenka i.e. Yenka.
- Zitya ratalu**, a race of *D. alata* in the districts of Jhansi and Unao, United Provinces of Agra and Oudh.





Summit of Gunung Belamut, with shoulder high scrub containing *Matonia*

THE GARDENS' BULLETIN, STRAITS SETTLEMENTS.

Vol. III

November 7th, 1924.

Nos. 7-8.

THE VEGETATION OF GUNONG BELUMUT IN JOHORE.

The present paper is an attempt to describe the vegetation on the upper part of Gunong Belumut, a mountain situated in the south of the Malay Peninsula, about the middle of the State of Johore. The summit is 3,321 feet above sea level, and the area here dealt with is that lying between an altitude of about 2,800 feet and the summit. The writer visited this locality in May 1923, in company with Mr. G. R. Fulton, Assistant Government Geologist, to whom he wishes to express his very cordial thanks for the opportunity of making the expedition.

The route followed was that made by Mr. J. G. Watson, Conservator of Forests, Johore, who had ascended the mountain a short time previously. Except a few plants obtained by Mr. Watson, no collections had been made on the mountain. The jungle track starts from about the 14th mile on the Kluang-Mersing road. From this point to the Sungai Berhidong at the foot of G. Belumut is about 11 or 12 miles, the track crossing the ridge of G. Chemundong at a height of 1,265 feet. From the camp by S. Berhidong, at 450 ft. above sea, to the summit of the mountain is about three miles.

The lower part of the ascent is through rather dry Dipterocarp forest, with Bertam (*Eugeissonia*) as the chief undergrowth. At about 2,500 ft. a transition begins to occur to a forest of crowded trees of much lower stature, gradually more and more covered with liverworts and mosses. Within about 300 ft. the change is complete from a fairly high forest to the mossy elfin forest which

covers most of the area between 2,800 ft. and the summit. On the northern slope however the mossy forest is replaced by an open scrub in which for the most part *Matonia pectinata* is dominant, with stunted shrubs and trees growing above it at intervals (Plate I). The transition from the forest to the scrub is very sharp near the summit, but less so at lower altitudes. The name Belumut is descriptive of the mossy condition of the summit.

A camp was made on the summit of the mountain, and seven days spent there. As complete a collection as possible was made both of flowering plants and cryptogams, and the writer is greatly indebted to Mr. I. H. Burkill for the determination of the former, and to Mr. H. N. Dixon for the determination of mosses. The writer is responsible for naming the Pteridophytes and has attempted to identify the more important of the Liverworts which form such a conspicuous feature of the vegetation.

Climatic conditions.

During the seven days spent on the upper part of the mountain, the summit was covered with cloud every night, but either in the morning or later in the day the cloud lifted, forming again about sunset or earlier. One evening light clouds were formed on the summit about sunset (6 p.m.), but soon disappeared; and no more came till about 9 p.m. Every morning, whether there had been rain or not, the bryophytes on the trees and ground were saturated with water from the clouds. Rain occurred on four days out of the seven, but only once at all heavily. On the finest day the bryophytes were very much dried up, except in the most sheltered places, and the leaves of *Hymenophyllums* were distinctly shrivelled.

Unfortunately no daily record was kept of the direction of winds, but on those days on which the facts were noted the evening winds forming the clouds came from the south-west. This is probably a seasonal matter, dependent on the monsoons. Lying to the south and south-west of G. Belumut are two or three other lower ridges stretching east and west. Lines of cloud formed first on these ridges, but did not pass on as such to Belumut. The wind blew up the southern slopes of the mountain, forming cloud as it ascended, and the summit was soon covered with thick mist. Judging by the appearance of cloud formation as observed on the other ridges, the cloud was continually added to from the south and dissipated by the continuing wind towards the north. In these circumstances the southern slope would receive most of the moisture, and no doubt this condition prevails throughout the south-west monsoon. During the north-east monsoon there may be heavier rain and more continuous clouding, affecting the south slope considerably as well as the north.

Observations of temperature were not made. When sunny it was quite hot on the summit, probably not much cooler than the low



At the junction of the Matonia-scrub with the mossy forest,
on the western ridge Gunong Belumut.

country, but in the cloud and at night it was much cooler, probably down to about 15° C.

Geology; Soil conditions.

The writer is indebted to Mr. G. R. Fulton for particulars of the geological nature of the country round G. Belumut. This mountain and the ridges south of it (of which the nearest, G. Berchuak, was ascended) are formed of hornblende granite, while the ridge to the north, of which G. Berhidong forms the highest part, is of rhyolite.

On the eastern ridge of G. Belumut, just below the summit, in the forest, there were nearly 30 cm. of dark soil above the weathered granite which formed a yellowish clay with much grit. The upper layers of the soil contained many small roots but very little of undecomposed plant material. The lower layers contained less organic matter and were more gritty. Granite of this character may weather to a stiff clay, but it is possible that in such exposed positions as these ridges the silicates may be first weathered and partly washed away before the grains of silica are decomposed, the result being a more or less sandy soil. On the north face, in more open places in the Matonia scrub, the soil is very sandy and has a much thinner layer containing humus. On the south face, where the slope is steep with many large boulders, the soil is largely present in hollows and crevices between the rocks, which are themselves covered with a more or less thick mat of vegetation, at least of bryophytes and ferns.

The rhyolite of G. Berhidong gives a fine clay soil with hardly any sand, and it would be interesting to know whether the vegetation on its summit shows any difference from that on G. Belumut. Unfortunately an attempt to make the ascent failed, and time was not available to make a second.

The Mossy Forest.

1. General.

The best development of the mossy forest is on the south slope. This is far steeper than that to the north, with very large boulders of granite. The trees here are fully 30 ft. in height. Their trunks up to almost shoulder height are thickly covered with masses of liverworts and, less abundantly, mosses. Higher up, the covering of bryophytes is thinner, and different species are found. The uppermost part of the tree often bears lichens, which sometimes encroach on the mosses, and phanerogamic epiphytes. On the ground (here very uneven) is a carpet of mosses; herbaceous vegetation is not well developed, but several species occur, as well as pandanus, a few palms, and ferns. Locally a bamboo (*Dendrocalamus flagellifer*?) is quite abundant. As one climbs up on to the ridge there is a sudden dwarfing and much closer growth of the trees, most of which are here not more than 25 feet, the bases still covered with enormous spongy masses of liverworts. Continuing over the ridge on to the north slope, one comes out into the open scrub (See Plate II).

2. The Trees.

Walking in the forest down the ridge westwards from the summit, the following were noted as the largest trees seen. Only those of 30 cm. or more in girth were measured.

Number measured.	Species.	Maximum girth.
8	<i>Calophyllum canum</i>	46 cm.
6	<i>Tetractonia</i> n. sp.	68.5
5	<i>Podocarpus neriifolius</i>	91
4	<i>Gordonia imbricata</i>	56
3	<i>Tristania merguensis</i>	46
3	<i>Eugenia caudata</i> (?)	76
2	<i>Parinarium parviflorum</i>	45
2	<i>Eugenia oblata</i> (?)	43
1	<i>Garcinia</i> sp.	38
1	<i>Quercus rassa</i>	38

The *Tristania* was not seen flowering, so that its identification is not certain, but it is most probably the species named, which is abundant on Mt. Ophir.

An area of about 20 feet (6.1 m.) square was selected, situated on the top of the south slope, one edge being almost along the summit of the western ridge, near the summit of the mountain. In this all woody plants (rattans excepted) above 2 m. in height were measured as regards diameter at breast height, and their total height estimated.

The following is a summary of the measurements made in the selected area. Many of the trees were not flowering or fruiting, and their identification is consequently somewhat doubtful, especially in the case of *Eugenia*.

No. of individuals.	Species.	Diameter.		Max. height.
		Max.	Mean.	
14	<i>Eugenia caudata</i>	10.2 cm.	4.3 cm.	7 m.
14	<i>Eugenia oblata</i>	11.4	3.8	9
10	<i>Eugenia microcalyx</i>	6.4	3.6	9
5	<i>Calophyllum canum</i>	10.2	6.9	10.5
5	<i>Adinandra</i> sp.	4.3	2.8	7.5
4	<i>Garcinia diversifolia</i>	12.7	5.1	9
3	<i>Eugenia subdecussata</i>	7.6	4.3	7.5
3	<i>Wikstroemia Chandolleana</i>	3.8	2.8	3.5
3	<i>Symplocos adenophylla</i>	8.1	4.3	9
3	<i>Pandanus</i> sp.			5
3	<i>Elaeocarpus petiolatus</i>	1.3	1.3	2.5
3	<i>Ilex Griffithii</i>	4.8	3.6	7.5
3	<i>Pinanga disticha</i>			2.5
3	<i>Xanthophyllum Wrayi</i>	11.4	4.8	7.5
3	<i>Daphniphyllum laurinum</i>	11.4	8.1	9
2	<i>Eugenia venulosa</i>	10.2	7.6	7.5
2	<i>Quercus Rassa</i>	7.6	5.6	9

No. of individuals.	Species.	Diameter.		Max. height.
		Max.	Mean.	
2	<i>Myrsine Porteriana</i>	8.1	5.6	7.5
2	<i>Lasianthus</i> sp.	3.3	2.2	5.5
1	<i>Eugenia bracteolata</i>	4.6		6
1	<i>Microtropis ophirensis</i>	2		2.5
1	<i>Eugenia claviflora</i>	4.6		3.5
1	<i>Quercus Wenzigiana</i>	2.2		3.5
1	<i>Elaeocarpus parvifolius</i>	2		3
1	<i>Gaertnera Königii</i>	2		2.5
1	<i>Timonius penangensis</i>	4.6		6
1	<i>Vaccinium Teysmanni</i>	1.3		2.5
1	<i>Tristania merguensis</i>	1		2
1	<i>Ardisia</i> sp.	2		4.5
1	<i>Tetractonia</i> sp.	7.6		10.5
1	<i>Podocarpus neriifolius</i>	28		9
1	<i>Palaquium obovatum</i>	15.2		10.5
1	<i>Parinarium parviflorum</i>	8.7		9
1	<i>Lindera bibracteata</i>	2		2.5

Mean diameter of all trees measured 4.5 cm.

Only one specimen of *Podocarpus neriifolius* was present in this plot, being a very old tree lying over obliquely, its topmost shoots reaching about 9 m. vertically above the ground. This species was quite abundant in the mossy forest, though probably less so than in the *Matonia* scrub and when one looked at the slopes of the mountain from the summit or from the neighbouring peak of G. Berchuak, its pale yellow-green foliage showed up strikingly. The disappearance of the *Podocarp* on the lower slopes was practically coincident with the lower limit of the mossy forest.

Gordonia imbricata and *Tetractonia* sp. have very much the same habit and form of leaf, and it was not found possible to distinguish the two with certainty from a distance. Both are taller than the majority of the other trees and have a very open mode of branching, with few large rounded leaves. On looking along the ridge from the summit of the mountain one was at once struck with the way in which these two trees both projected above the general level of the forest. They were also both prominent among the isolated trees in the *Matonia* scrub, and grew taller there also than any others. It was not possible to decide which was the more numerous, but it is thought that the *Tetractonia* is probably so, at least in the scrub.

Calophyllum canum was one of the most striking trees as one walked through the forest, on account of its very straight growing trunks. The smaller leaved *C. venustum* was less abundant.

Tristania merguensis was found particularly in the scrub, but also in the forest, especially on the ridge. There were often very old trees in the transition zone between forest and scrub, with very thick bushy branches, some apparently dead.

The above were the most noticeable of the larger trees; of smaller trees the list shows that *Eugenia*s make up a large proportion.

It is very noticeable that all the trees are of xerophytic character, with small simple usually entire coriaceous leaves.

The mean diameter of 4.5 cm. indicates that the forest is of close growing slender trees. On approximately 400 square feet (37 sq. metres) 103 woody plants of more than 2 m. in height were recorded, giving an average distance apart of about 2 ft. (60 cm.) The thick growth of liverworts round the bases of all plants increased the apparent closeness of the trees. The oldest trees were sometimes fallen over obliquely, one being noticed almost fallen to the ground with several upright branches growing from it. For the most part the small trees grow fairly straight. There is little or nothing of the formation of aerial supporting roots, described as characteristic of the mossy forest on Mt. Maquiling, Luzon. On the south slope where the mossy forest is best developed the steepness and the presence of large granite boulders prevent the trees from growing so closely, but here, being more protected, they are on the whole taller and have larger crowns; the bamboo is also more abundant. A slender *Pandanus* is fairly frequent in the forest, and is often quite tall, while small plants of a broad leaved species, possibly *P. atrocarpus*, were found quite near the summit of the mountain.

Plate III shows a typical part of the forest close to the area in which the trees were measured.

Undershrubs were few. The following were collected: *Allo-morphia exigua*, *Memecylon Hullettii*, *Gelonium glomerulatum*, *Daphniphyllum* sp., *Ardisia* sp., *Coniothalamus macrophyllus*, *Elaeocarpus petiolatus*. These are all quite large leaved in comparison with the trees of the forest, and the leaves less coriaceous.

Pinanga disticha was fairly frequent, and also a rattan, *Calamus brerispidii* Ridl. A second *Calamus* and a *Dacnophorops* were not so common. *Freycinetia rutila* was present.

3. Ground vegetation.

(a) **Herbaceous flowering plants.** These were never very abundant. The following were the most abundant species, and, with seedlings of woody plants, formed the chief ground vegetation: *Sonerila bicolor*, *Pariboca pyrolaeifolia*, *Didymocarpus platypus*, *Pentaphragma* sp., *Argostemma spinulosum*, *Cephaelis cuneata*, *Zingiber puberula*, *Alpinia rafflesiana* (occasional). *Lorocarpus* sp. and *Sonerila erecta* were found chiefly on granite boulders where only a thin covering of mosses was present. *Balanophora multibracteata* was locally quite common. In the more open parts, especially in the broader transition zone between forest and scrub at somewhat lower altitudes (about 3000 ft.) *Cypripedium barbatum* was very abundant, being the most frequent herbaceous plant.



Typical mossy forest, near the summit of Gunong Belulut,
upon the south face

(b) **Pteridophytes.** These were not so abundant as might have been expected. Of small species, *Selaginella plumea* Spr. and *S. acutangula* Spr. (?) were frequent, *S. Wattii* Bak. being found chiefly on rocks and among liverworts on tree trunks. The following ferns were frequently seen: *Taenitis blechnoides* (nearly always with simple leaves), *Schizolema divergens* (less abundantly than at lower altitudes), *Lindsaya repens* (mostly small sterile plants), small plants of *Trichomanes rigidum*, and an *Alsophila* (a species found also on Mt. Ophir, possibly undescribed) the stems of which reached several feet in height. Young plants of the last named were also common. In one place several plants of *Cheilanthes bicuspidata* (Bl.) were found, in the shelter of a large rock. *Tupelinidium biserratum* v. A. v. R. (*Davallia biserrata* and *D. gracilis* Bl.), both less and more divided forms, were found in more open places on the south slope. *Gleichenia linearis*, *G. luewigata* (Willd.) *G. glauca* (Thb.), and *G. hirta* Bl. were occasional throughout the forest, usually with long petioles which carried the leaves up among the branches of the trees. *Lycopodium cusuarinoides* Spr. had the same habit, often with stems several yards long, especially on the ridges; its thickly tufted leafy branches, bearing very numerous strobili, were very abundant amongst the bushes close to the summit. *L. cernuum* was also present, but not in such quantity.

(c) **Bryophytes.** A large part of the ground surface had some growth of mosses or liverworts, in addition to those present on the trees. It was difficult to estimate the relative abundance of these, as the writer was not familiar with the different kinds. Conspicuous were *Leucobryum javense* (Brid.) Mitt. and *L. Bouringii* Mitt., and thick tufts of *Rhizogonium latifolium* Bry. Jav.; *Sematophyllum secundum* (Hornsch. and Reinw.) was also frequent. No doubt other smaller mosses were equally abundant. *Trichosteleum Boschii* (Doz. and Mol.) Jaeg., *Trismegistia rigida* (H. and R.) Jaeg. and *Isopterygium albescens* (Schwaegr.) Jaeg. were also found on the ground. Liverworts were not so numerous as on the trees, but species of *Metzgeria* and *Ancura* were common both on the ground and on the bases of the trees.

4. Epiphytes.

(a) **Bryophytes.** The liverworts present in greatest quantity were *Mastigophora dictydos* (Brid.) Nees, which was present everywhere and appeared to withstand considerable desiccation, and a large species of *Bazzania*. The *Mastigophora* formed almost pure cushions, sometimes several inches in thickness, round the bases of many of the trees. Mixed with it were small quantities of more delicate species of *Frullania*, and various other plants which appear referable to the genera *Bazzania*, *Chiloscyphus* and *Plagiochila*. *Lepidozia subintegra* Lindenb. (?), a very fine hair-like species with minute leaves, was often present in masses, sometimes mixed with *Mastigophora dictydos*. *Trichocolea tomentella* (Huds.) Nees, was also fairly abundant.

Of the less abundant species a handsome large-leaved *Schistochila* was very noticeable. A *Pleurozia* was found chiefly on the upper part of tree trunks, where no other species would grow. Its habit of growing very closely appressed to the surface of the bark is no doubt an advantage in such situations. Where it was most exposed it was often deep red in colour. It was often fertile.

Of Mosses *Sematophyllum secundum* and *S. rigens* Broth. (previously collected only on Mt. Ophir) were recorded as present on the lower parts of tree trunks. On the upper branches of the trees, in very exposed situations, were found large compact cushions of *Syrhophodon borneensis* (Hpe.) Jaeg.

The upper branches of the trees had also lichens on them, but these were not collected. One of the lichens was often seen growing over and apparently smothering bryophytes growing in rather exposed positions.

(b) **Pteridophytes.** The most abundant epiphytic fern was *Hymenophyllum serrulatum* (Pr.), an unusually slender form. *H. denticulatum* Sw. was also common. A very small species, apparently closely allied to *H. borneense* Hk., was found twice only. These all grew among the liverworts on the tree trunks. Usually somewhat higher up, also among bryophytes, the following were quite common: *Polypodium decorum* Brack., *P. malaicum* v. A. v. R., and a small species near to *P. cornigerum* Bak.; *Scleroglossum sulcatum* (Mett.) v. A. v. R. was not so frequently noticed, and *Polypodium cucullatum* Nees and Bl. was seen once only. On still higher branches *Humata repens* (L. fil.) was occasionally present: and *H. heterophylla* (Sw.) and *Oleandra neritiformis* Cav. (both sterile) were each seen once. One plant of *Lycopodium phlegmaria* was found in a very exposed position on the upper branch of a tree in the scrub; it was very stunted.

(c) **Phanerogams.** Epiphytic flowering plants were not very numerous. They were found on trees both in the forest and in the scrub. The most striking were *Pachycentria tuberculata*, *Medinilla Clarkei* (also on rocks on summit) and another *Medinilla*. *Dendrobium uniflorum* and *Ceratostylis gracilis* were the only orchids at all abundant in exposed positions; in the forest, on lower branches, *Podochilus sciuroides* was frequent. *Eria poculata* was occasional, also *Bulbophyllum* and *Coelogyne* sp., not in flower. *Rhododendron jasminiflorum*, *R. longiflorum*, *Elytranthe retusa* and *Hydnophytum formicarum* were occasional, also a small *Dischidia*. *Corysanthes mucronata* was found in several places growing in the masses of liverworts on the tree trunks, apparently just come into flower. Its tubers and roots were embedded in the spongy substratum, the small solitary leaves and flowers showing just above the surface. Some of the plants were exceedingly minute.

Of climbers, *Nepenthes ampullaria*, *N. Rafflesiana* (?) and *Smilax lueris* were frequent, but more usually present in the more open scrub.

The *Matonia* scrub.

Near the summit of the mountain, this vegetation consists typically of a close shoulder-high growth of *Matonia pectinata*, associated with various plants of similar stature, and isolated trees and shrubs of varying size. The most important of the former are *Pandanus ornatus*, *Gahnia javanica*, *Lepidospermum chinense* and *Dipteris conjugata*. *Dipteris* is not found in the most exposed places, being obviously less xerophilous than *Matonia*, and though almost always present was never seen dominant. The orchids *Spathoglottis aurea* and *Bromheadia palustris* were quite abundant; and *Eulhemis leucocarpa* was occasionally seen. Underneath the *Matonia*, and especially round the bases of trees and shrubs, mosses and liverworts covered the ground as in the forest.

In the most open places, on very sandy soil, *Gleichenia circinata* and *Actinoschoenus filiformis* were the dominant plants, and here also on the ground were noticed the more xerophytic liverworts and *Leucobryum* spp.

The following trailing and climbing plants were frequent: *Nepenthes ampullaria*, *N. ? Rafflesiana*, *Dissochaeta annulata*, *Vitis gracilis*, *Smilax laevis*, and *Lycopodium casuarinoides*. *Gleichenia linearis* was present, but never abundant.

The most conspicuous trees also present in the mossy forest were; *Tetractonia*, *Gordonia*, *Podocarpus*, *Calophyllum* spp., *Tristania*. *Podocarpus* was very abundant, including many small plants, and its yellowish foliage made it conspicuous. All the trees were somewhat dwarfed as compared with their growth in the forest, *Calophyllum* most markedly, *Tetractonia* and *Gordonia* least so. The larger trees had a very weather-beaten appearance. Epiphytes were few, and stunted owing to exposure.

Other woody plants noted as frequent were *Quercus Rasna* (producing fruit at a height of only 3 feet) *Timonius pinangensis*, *Symplocos adenophylla*, *Melastoma* sp., *Elaeocarpus relucosus*, *Adinandru dumosa*, *Hedyotis congesta*, *Ardisia Burnesii*. On the very summit, surrounding the few huge granite boulders, was a very dense growth of shrubs, with some *Matonia*. *Freycinetia valida* was climbing on these, and *Scleria* sp. was collected. Under the shade of the rocks grew a *Lophatherum*. On the boulders were a few epiphytes, including *Medinilla Clarkei*, *Sonerila erecta*, *Bulbophyllum* sp., and *Humata repens*.

Some 300-400 feet below the summit, on the western ridge, the trees in the scrub were much larger and closer, and the *Matonia* much less, and a broad transition zone between scrub and forest developed, in which *Cypripedium barbatum* was very abundant. The transition from scrub to mid-mountain forest was not seen.

The same scrub was found on the northern face of Gunong Berchuak to the S. E. of Belumut. This hill has twin summits close together, both about 3,000 ft. above sea, and it was interesting to find that on the northern side of the southern summit there was still open *Matonia* scrub.

Comparison with other descriptions of mossy forest.

There are various references in Mr. Ridley's papers to mossy forest on the mountains of the Malay Peninsula, but no detailed account anywhere. It seems probable that everywhere in the cloud belt dwarfed mossy forest prevails, while the tops of the highest peaks in the main range are covered with a xerophilous scrub in which *Mitonia* is usually present. On isolated hills such as Kedah Peak* the mossy forest is found at much lower altitudes than on the mass of the main range, and the same is true of Belumut. The peculiarity of Belumut in having mossy forest on the south slope only must be due to local conditions of weather and topography. The scrub and forest on Belumut appear to correspond with the open rock vegetation and the valley woods of the Padang of Gunung Tahan as described by Ridley.¹ There is no detailed description of the vegetation of the top of Mt. Ophir, (distant 66 miles from Belumut) but most of the species collected on Belumut have been found also on Mt. Ophir.² The writer cannot however attempt a floristic comparison in the present paper.

The Belumut mossy forest appears to be very similar in general organisation and appearance to that described by Miss L. S. Gibbs on Mt. Kinabalu in British North Borneo,³ though most of the species are different. Miss Gibbs' Pl. 6 fig. 3 shows a tree of *Leptospermum flavescens* which has a very similar habit to the *Tristania* on Belumut. In another paper Miss Gibbs has short notes on similar forest on the ridges of the Arfak Mountains in New Guinea.⁴

The mossy forest on Mt. Maquiling in Luzon described by Brown⁵ differs in various respects, but it is said that all such vegetation on the I hilipin ins is not quite of the same type (p. 102). The differences from Belumut are principally in the prevalence of plants with aerial roots, and in the greater abundance of tree ferns and herbaceous ground vegetation. On Mt. Maquiling the growth of woody plants was about as dense as on Belumut, 157 individuals representing 17 species being recorded on 50 sq. metres; on Belumut 106 individuals representing about 30 species were found on 37 sq. metres. On Mt. Maquiling there was a bigger proportion of plants with non-entire leaves on the summit than at lower altitudes, whereas on Belumut the only tree with noticeably toothed leaves was *Parinarium parvifolium*. On both mountains trees of the mossy forest all have simple and rather small leaves.

The brothers Sarasin give brief descriptions of mossy forest on the mountains of Celebes,⁶ and some photographs.

*See Ridley, *Journ. S.B.R. Asiatic Society* No. 34 pp. 23-30 (1900).

1. *F. M. S. Museums Journ.* Vol. 6, p. 132. (1915).

2. See Ridley's paper in *Journ. S.B.R. Asiatic Society*. No. 35 pp. 1-28 (1901).

3. *Journ. Linn. Soc., Bot.* Vol. 42 pp. 1-240 (1914).

4. *A contribution to the phytogeography and flora of the Arfak Mountains etc.* (Read before the British Assn. 1916) Taylor and Francis, London.

5. Brown, W. H.; *Vegetation of Philippine Mountains*. Manila, Bureau of Science publication No. 18 (1919).

6. Sarasin, P. & F. *Reisen in Celebes*. Wiesbaden, 1905.

(Giesenhagen (*Ann. Jard. Bot. Buitenzorg*, 3rd. Suppl. pp. 711-789, 1910) gives a description of the conditions under which a great development of moss growth occurs in various localities in Java and Sumatra, with a discussion of the growth-forms which mosses assume. He does not deal with the conditions under which the different growth-forms appear. There is a reference to this, however, in a short paper recently published by W. Seifriz (*Journ. of Ecology*, Vol. 12, pp. 307-313, 1924) in which the altitudinal distribution of mosses and lichens on G. Gede in Java is discussed. From about 5500 to 7000 feet there is a moss zone, in which the pendent type is very abundant; this is the zone of *Podocarpus imbricatus*. The next zone, from 7000 to 8000 feet is "very open in character, with a prolific growth of herbs on the forest floor. Mosses and lichens are very poorly represented." The highest zone, 8000 to 9200 feet, is "a foggy, windswept region typified by small gnarled trees, mostly of the genus *Vaccinium*." In the lower part of this zone there is much moss growth, but entirely of compact tufted forms, clinging close to the tree trunks: the cause of the difference between this and the lower moss zone is ascribed to the great force of the winds in the higher zone, accentuated by the lower stature of the trees. In the upper part of this zone the vegetation is more open, and the consequent greater light and reduced humidity account for the replacement of mosses by lichens. The conditions on G. Belumut are quite different, probably owing to the limited range in altitude of the cloud zone. There is nothing comparable to the great development of the pendent type of moss found in the fairly high *Podocarpus* forest on G. Gede. It needs more protection from wind than is found in the dwarf forest on Belumut. Closer growing mosses are found, but again not exclusively, as in the upper zone on G. Gede. The great preponderance of liverworts is not described at all from G. Gede; there must be on G. Belumut conditions favourable for the growth of liverworts, particularly of *Mastigophora dichados*, which are absent from the upper zone on G. Gede.

Regarding the biology of liverworts, a paper of Goebel's is of importance (*Ann. Jard. Bot. Buitenzorg*, 7, pp. 21-69, 1898). He describes the various water-holding lobes present on the leaves of many species, distinguishing three types; species possessing these are all epiphytic. The only notable species on Belumut that comes under any of his categories is the *Pleurozia* (*Physotium*), which is among the most specialised of all. It occurs in exposed places on the upper parts of tree trunks, where its large water sacs are of great service. *Frullanias* were not found abundantly on Belumut; two species grew amongst the *Mastigophora*, no doubt partly protected by it. *Mastigophora* itself possesses no water sacs; its finely divided small leaves are able to hold a certain amount of water, but it will dry up fairly easily. Probably its habit of growing in large spongy masses prevents complete desiccation of the whole plant.

Karsten (*Ann. Jard. Bot. Builenzorg*, 12, pp. 119-122, 1892) gives a list of liverworts found in Amboyna, on mountains 1250 and 1050 m. (4100 and 3450 feet). At about 700 m. Agathis was found, and above the Agathis a dwarf forest of *Leptospermum*, *Vaccinium*, *Podocarpus* etc., the trees being overed with bryophytes. He mentions particularly very fine species of *Schistochila* (*S. sciurea*) and *Pleurozia* species of which were also among the most conspicuous liverworts on Belumut. He gives a list of species, including *Mastigophora dichados*, but this is not mentioned as specially abundant.

Causes of the development of mossy forest.

Brown states that mossy forest is confined to the cloud belt (l. c., p. 103), and this appears to be well borne out by all other records. The great abundance of mosses, liverworts and Hymenophyllaceae, in varying proportions, is a feature which probably could only occur in such situations. It does not seem to have been pointed out, however, by previous writers, that these plants may have frequently to stand a considerable degree of dessication, as was undoubtedly the case on Belumut. The second feature which all these forests have in common is the dwarfing of tree growth. The heavy growth of epiphytes has been suggested as one cause, but this alone cannot be responsible, since trees in the open scrub on Belumut were more dwarfed than the same species in the forest. Brown, by careful correlation of many measurements of environment conditions at different altitudes on Mt. Maquiling, concludes that the dwarfing is due to a combination of lowered temperature and decrease in light intensity as compared with conditions on the lower slopes of the mountain.

Miss Gibbs' suggestion (Kinabalu, p. 47) that mossy forest may be due to edaphic factors, leading to the conclusion that it is a secondary formation, does not seem to be well founded, though doubtless edaphic factors are responsible for variations in its composition and physiognomy. Brown remarks that mossy forest probably does not constitute a single homogeneous type, but that our present knowledge does not suffice to classify the various forms it may adopt, and this seems a very reasonable conclusion.

The pioneer vegetation on the summit of Gunong Belumut must have been of a xerophilous nature, owing to the fact that clouding is not continuous and that there are intervals of considerable insolation. Matonia scrub therefore probably represents an early stage in the development history of the summit vegetation, becoming transformed gradually into mossy forest in those parts where clouding was most frequent. The condition of the north slope thus represents an arrested early phase in the development, which is doubtless in equilibrium, having reached as advanced a stage as conditions will permit. Edaphic factors may be partly responsible for this arrest in development, but observations made up to the present are too limited for any definite opinion to be given.

Considering the mossy forest as the climax plant association of the cloud zone, it is interesting to compare it with climax associations of temperate regions. The most striking fact which is at once evident is that we have here no single dominant species. We appear rather to have present a number of species of about equal stature no one of which has sufficient advantage over the others to approach dominance. All have rather small simple leaves, decidedly coriaceous in texture. The most numerous appear to be various species of *Eugenia*. In their variety these trees agree rather with the second storey of the Dipterocarp forest than with the upper storey, in which there appears to be definite dominance of one or a few species. *Gordonia* and *Tetractonia* and possibly others certainly project above the bulk of their neighbours, but it is doubtful whether they protect the other trees in any way.

R. E. HOLTUM.

TWO HYBRID TREES OF HEVEA BRASILIENSIS × H. CONFUSA.

In the Gardens Bulletin, II (1919) p. 113, an account was given of a *Hevea* tree found in the Economic Garden, and determined to be *Hevea confusa*. That species is known to be a very inferior producer of rubber, and a danger to rubber-cultivation where its presence can lead to hybridisation. For that reason the tree was destroyed at once. It had newly fruited and seedlings had been raised of which two were kept for observation in a remote part of the Botanic Garden.

Those two have just flowered at the age of five years, and been destroyed in their turn, so that nothing of the objectionable type persists. They had been under observation through their growth, and their flowers have been very carefully examined: the result has been a complete demonstration that both trees were hybrids with *H. brasiliensis* as the male parent.

This demonstration of cross-pollination between the two species is not as interesting as another given by Mr. H. C. Pearson in the *India Rubber World* for October 1st, 1919, p. 46, for in that, seed of a fine *H. brasiliensis* in Trinidad produced plants which showed *H. confusa* in their constitution originating from a tree one-hundred yards away, the distance between the two parents having been very much less in the Singapore. But it is interesting as a demonstration of the great degree to which cross-fertilisation is carried in the Rubber tree. It is a cross in the opposite direction to Mr. Pearson's namely of male *H. brasiliensis* on female *H. confusa*. It is also a lesson that from a plantation of even pure *H. brasiliensis*, if first class seed is wanted, the inferior yielders should be removed, as cross-pollination occurs to such a great extent.

The two hybrid trees of the Botanic Gardens differed between themselves. The one had darker bark than the other, and leaves with more of the arching in them that characterises *H. obtusa*. Both had the white latex of *H. brasiliensis*, but that meagre as in *H. confusa*. When the flowers appeared, the males were found intermediate in shape, and to face earthwards as in *H. confusa*, and were softly downy outside, but the anthers were as in *H. brasiliensis*. Female flowers were very few, probably because the trees were flowering while still too young for full reproductiveness.

I. H. BURKILL.

VARIETIES OF *DIOSCOREA PENTAPHYLLA* IN MALAYSIA.

This widely distributed species occurs in several varieties in Malaysia and with our present knowledge five may be defined. They are:—

Tubers elongated: rusty hair abundant on the above-ground parts: the leaflets broad *malaica*

Tubers not elongated: so that their length is not twice their greatest diameter:

Tubers not flattened, abundantly covered with roots, much lobed: rusty hair abundant on the above-ground parts: leaflets broad:

Leaflets large, up to 20 cm. by 6 cm.: flowers large: numerous large simple leaves produced among them *papuana*

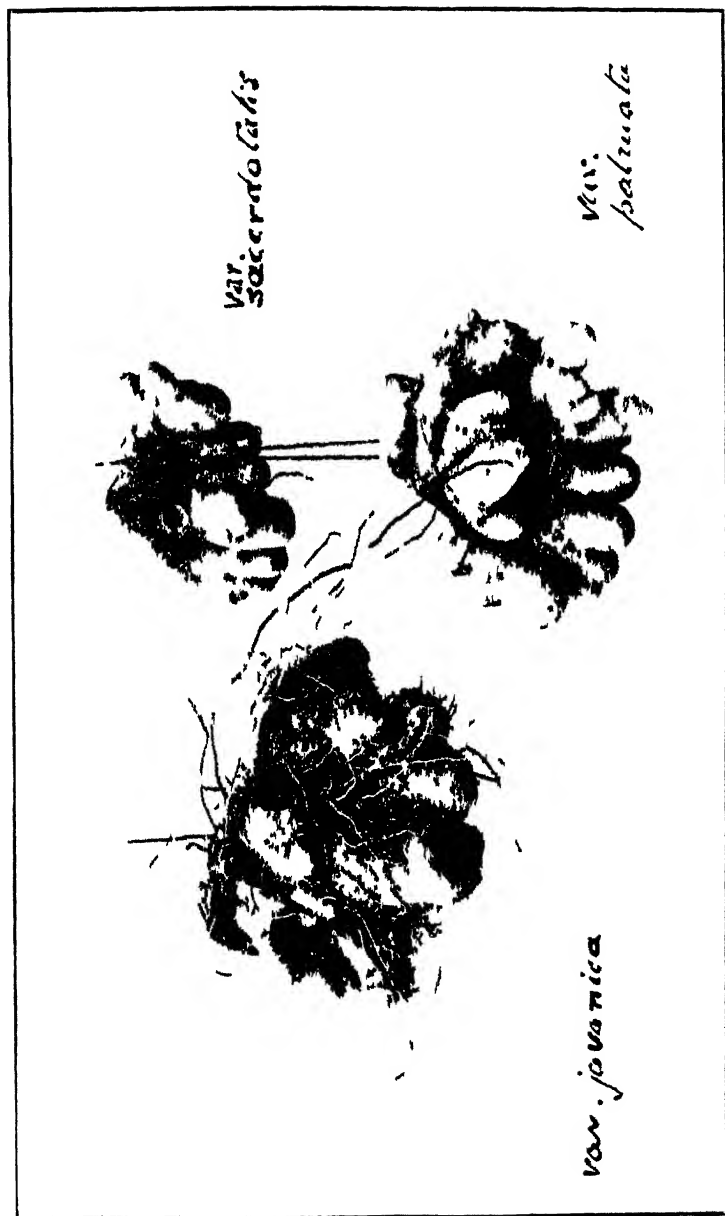
Leaflets smaller, up to 10 cm. by 3.5 cm.: flowers small: simple leaves about 2 cm. by 2 cm.

Tubers conspicuously flattened and relatively free from roots, much lobed: grey hairs present in the place of rusty red hairs;

Leaflets relatively large, up to 20 cm. by 4 cm.: flowers rather large: tubers as far as seen larger than in the next . . *palmeta*

Leaflets relatively small, up to 14 cm. by 3.5 cm.: flowers relatively small: tuber as far as seen smaller than in the last . . *sacredotalis*

The variety *malaica* is that which furnishes the “ubi jabbet” of the Sakais in the centre of the Malay Peninsula, and they not only eat it from wild sources but plant tubers in the neighbourhood of their houses. The Sakais of Northern Perak have another name



Tubers of three varieties of *Dioscorea pentaphylla*

for it, i.e. "kasu." and they too eat it. The variety *papuana* furnishes a food eaten in the neighbourhood of Port Moresby, where it grows wild, and is considered as of two kinds called "maloa" and "bakuta." The variety *javamica* is the wild plant of Java. The variety *palmata* occurs in cultivation in the Philippine islands, and the variety *sacerdotalis* in cultivation in Java.

As a help towards the definition of these varieties the plate opposite gives figures of three of them. Four tubers of the variety *maluica* were figured in this Bulletin in the plate in no. 3 of volume II, opposite p. 92.

The writer has eaten *D. pentaphylla*, var. *palmata* and found it good. As yet the variety *sacerdotalis* has not been eaten. The tubers of the other three varieties are certainly nauseous.

There is a kind in Papua near Port Moresby known as "lobeta" which seems to differ from the above, and needs more study.

With the knowledge to hand at present it is impossible to identify the three forms of *D. pentaphylla* which Rumph described in his *Herbarium Amboinense*, lib. ix., cap. xiv. He called them "the white," "the red" and "the fusc."

The white, he stated produces the largest tuber; they have the outline of a hood or cape, that is to say expanding downwards; and the lower margin ends in lobes. The upper part carries too much fibrous tissue to be eaten; the lower part is softer and can be eaten, but possesses a vile flavour. The red, he described as smaller, and a better food. The fusc colours the water in which it is boiled blackish and boils black itself. All three were to be found in the island of Bima i.e. Sumbawa: the red was also in Buru and Bali: one or another was also in Celebes, Amboina and the Moluccas, but he does not specify which. His figure more nearly suggests var. *javamica* than the others. It appears then that to fully understand Rumph's attention must be turned to Sumbawa.

In the last issue of this Bulletin, on p. 137, attention was called to certain interesting sanskrit names applied in Java to *Dioscorea pentaphylla*, and it was suggested that they indicate a religious use of the tuber as a food for fast days, similar to the use by the Hindus of Upper and Central India of *Dioscorea esculenta*, and of a meal made from *Dioscorea hispida*. These sanskrit names belong to the variety *sacerdotalis*; but there is no indication that the Hindus brought the variety into their kingdoms in Java with their religion; they found it probably in Malaysia and adopted it.

DIOSCOREA PISCATORUM OR TUBA-UBI, A FISH-POISON.

Dioscorea piscatorum, Prain and Burkill, is a newly published name for a plant which appeared in Mr. Ridley's *Materials for a Flora of the Malay Peninsula, Monocotyledons*, 2, (1907) p. 84, as *Dioscorea* sp. He had made acquaintance with it from a sterile herbarium specimen collected by Mr. A. D. Machado of the Komuning Estate in Perak; and then about the same time a reward was offered at an Agri-Horticultural exhibition in Kuala Lumpur for a collection of such fish-poisons as act like Derris; and in one of the competing exhibits was a tuber labelled "tuba-ubi" which Mr. Ridley, acquiring it for the Botanic Gardens, Singapore, identified as the *Dioscorea* collected by Machado (*Agric. Bull. Straits and F. M. S.*, 7, 1908, p. 443). He grew it until 1912; but it did not flower and no specimens were preserved. In 1915 a plant was found on Pulau Tioman with the characters of Machado's; but it was impossible to get it into cultivation as it was in full growth. In 1921 herbarium specimens and tubers, corresponding closely, were got from Sibolangit in Sumatra. These are in cultivation in the Singapore Botanic Garden, and the piscicidal properties have been proved, as the following note shows. A tuber from Sibolangit was figured in this Bulletin in the plate opposite p. 4 of the current volume, under the title of "a spiny yam from Sumatra."

Half of a tuber about 15 cm. long was pounded up with water. The tuber was very fibrous and light reddish in colour; the juice was slightly milky, with a soapy froth, and of the same colour as the flesh. It was poured into a vessel 60 by 38 cm., into which water had been run to a depth of 10 cm. Eight fish of the species *Puntius binotatus* (Cuv. and Val.) of length varying from 6.5 to 10.5 cm., freshly caught from the Gardens lake, had previously been placed in the vessel, and were swimming about vigorously. When the juice of the tuber was poured in, the fish at once appeared uneasy. They swam round and round the vessel rapidly, and frequently came to the surface with open mouths; then their movements gradually became less and in under ten minutes they turned over, floating motionless for a few seconds at a time, showing their white lower surface. The quiescent periods grew longer, and after a few more minutes active motion was occasional, and only by slight vibrations of fins and tail. When in this condition they were transferred to fresh water, but the poison had gone too far to admit of recovery and in a few minutes more they were quite dead.

We are indebted to Mr. F. N. Chasen of the Raffles Museum for the identification of the fish.

I. H. BURKILL.

R. E. HOLTUM.

A STUDY OF THE COCONUT FLOWER AND ITS RELATION TO FRUIT PRODUCTION.

Introduction.

The literature on the biology of pollination and fruit production of coconuts is extremely sparse and what little is available is distributed in numerous books and periodicals so that investigators have experienced great difficulties in consulting them. An attempt is made here to bring together all the available studies on the subject, including my own observations, a part of which have already been published in the *Poona Agricultural College Magazine* and the *Agricultural Journal of India* ⁽¹⁰⁾.

I am indebted to Mr. I. H. Burkill for the information quoted in this paper from the German and Dutch books and to Mr. F. N. Chasen for the identification of some of the insect visitors to coconut flowers.

The Inflorescence.

Coconut inflorescences are formed in the axils of every leaf of a bearing tree and not of every third leaf as some writers have supposed ⁽⁹⁾ & ⁽¹⁷⁾. It is true that some axils fail to throw out any inflorescences, but this is because these inflorescences have become abortive; and even then these aborted inflorescences do not bear any definite relation to the others which grow so as to justify the statement that the inflorescences are produced in the axil of every third leaf. A very prolific tree will produce twelve or more inflorescences per annum or approximately one per month. There are records of trees having produced sixteen inflorescences per year ⁽²⁾ & ⁽¹⁷⁾.

As the flowers appear in the axils of leaves, it will be worth while to know that the leaves are arranged on the stem in the form of a spiral so that every sixth leaf opens, nearly above the first one, that is, each leaf opens according to the calculation of Sampson in India ⁽²¹⁾, at an angle of approximately 142° round the circumference of the tree from the previous leaf. In Goa the coconut harvester divides the coconut trees under two classes, the right- and left-handed ones, according as the spirals formed by the leaves and, therefore, by the inflorescences, are right or left. Both Costa ⁽⁸⁾ and Loyola ⁽¹⁷⁾ who maintain that the coconut inflorescences arise in the axils of every third leaf give correct diagrams of the phyllotaxis of the coconut inflorescences. They were probably misled in their observations on the orientation of the coconut inflorescence by their mistaken view that the coconut leaves are arranged in concentric circles and not in a spiral.

The inflorescences first appears enclosed in a thick, fibrous sheath called the spathe which is again protected during its early life by one more yellow sheath of somewhat flat nature and of softer fibres. This outer sheath stops growing very early in the life of the inner spathe so that the latter punctures it with its hard point on

its ventral side (*i.e.* the side towards the subtending leaf) and comes out erect as a yellow somewhat flattened cone, which later on as it grows, turns green, curves a little outwards and becomes more round than flat. In course of time when the spathe is of full grown, the development and distension of the inflorescence within causes a great pressure on the walls of the spathe with the result that it ruptures longitudinally along a groove usually on its ventral side and the flowering branch eventually emerges: sometimes, however, the rupturing of the spathe takes place on its dorsal side but then the spadix turns round till the inflorescence within falls out. The process of splitting is very slow, the slit which appears at first at a point about an inch and half from the apex, takes about twenty-four or more hours to reach down and give egress to the inflorescence. It is at first yellowish white in colour, but later on it turns greenish and also inclines downwards from its vertical position.

The cocount is essentially a monoecious plant, that is, stamens and pistils are produced in separate flowers on the same tree and in the case of coconuts in the same inflorescence, and, though some coconut palms will at times show a very marked tendency to produce spadices with all florets male, spadices are not usually produced in coconuts where all flowers are female and none male. The tendency to produce completely male inflorescences is particularly apparent when the palm produces the spathe for the first time in its life. There is a great variation in such trees: some will produce their second or third inflorescence with female flowers, while others will bear no female flowers even in the sixth inflorescence. If this variation is due to hereditary qualities, then this factor has also to be taken into consideration in selecting seed-nuts. The tendency to produce completely male inflorescences is at times manifested by trees which are given rest after a prolonged period of tapping for toddy.

The inflorescence itself consists of many flower-bearing ramifications or spikelets situated on a fleshy peduncle: hence the inflorescence is termed a spadix. Its size varies from two and half to six feet in length from the tip to the base, depending upon the vigour and individuality of the palm. Each branch is fringed with numerous male florets from tip downwards and lower down bears one or more female flowers, all the flowers being sessile or subsessile as Aldaba calls it. At times, however, some of these ramifications become spatulate and then partially or wholly sterile. Some of the branches in an inflorescence may produce secondary branches. As far as my observations stands, such inflorescences rarely produce female flowers which may be produced even on the secondary branches. Most of these inflorescences were noticed on trees heavily manured with nitrogenous manures, but I was not able to ascertain whether the manure was responsible for the branching and reduced fertility of these spadices.

The Male Flower.

The male flowers always exceed the number of female flowers in the same spadix and may vary from a few hundreds to thousands, depending upon the number of ramifications in the spadix and the length of the flower-bearing regions in them. Each male floret has six yellow perianth leaves arranged in two whorls, the inner three alternating with others which are about one-third of the former in size. Enclosed in this floral envelope there are six hammer-shaped stamens which yield large quantities of powdery yellow pollen. Aldaba ⁽¹⁾ has estimated that each male flower carries about 272, 358, 504 pollen grains. In the centre of each male floret there is a rudimentary pistil which divides at its apex into three teeth, each bearing a gland, the nectar of which attracts ants, bees and other creatures. Rarely this rudimentary pistil is absent ⁽¹⁹⁾. A case has been noted where these abortive ovaries were stimulated to grow so that the coconut palm bore, "instead of the few ordinary fruits at the base of the spadix, great numbers of small, crowded, narrow, quite banana-like fruits." ⁽²¹⁾ The male florets start opening from the tip downwards and liberate pollen, though sometimes a few flowers may open out of order. This opening of male flowers and shedding of the pollen lasts about a month, the inflorescences with secondary branches taking a little more than the usual period.

The Female Flower.

The female flower are comparatively extremely few, their number in each spadix varying from zero to over 300 and being dependent upon the strain, treatment, etc. They are always produced towards the basal portions of the spikelets. Many of the yellow-nut-producing varieties from the Konkan (West Coast of India), for instance, are usually very shy in bearing, while the dwarfish varieties of Goa (the *Benaully* seed) or dwarf varieties of Malaya enjoy the reputation of being heavy producers.

Prior to its opening, the female flower is a small spherical body of about half an inch in diameter with a great resemblance to a small nut. These female flowers consist of six floral leaves which are arranged as in the male flowers and which completely envelope the pistil; but these are much larger and stiffer than those in the male florets, and the outer three are almost equal in size to the inner ones. Apart from these six perianth members, there are two more just at the point of attachment of the flowers to the stalk, resembling the others in colour and texture, but differing from them in that they are broader and shorter. These two may be termed prophylls or bracteoles. Usually there is a male flower on each side of the female resting on the same cushion on which the female is seated. The pistil is a small whitish body consisting principally of embryonic tissue or husk. From its tip there extend downwards three ridges which make the whole ovary look globosely three-sided, each side being provided at its tip with a groove. These three grooves meet in the centre and are the parts of the stigma. It will

be seen by cross-sectioning the pistil that just above the thalamus there is the ovary (embryonic nut) with its three carpels, two of which normally become abortive even at this early stage. Sometimes, however, all three ovules get developed and when fertilised produce a trilocular-nut which on germination gives a tree commonly mistaken for a branched coconut palm.

Pollination and Fertilization.

Before proceeding any further a distinction between Pollination and Fertilization may be made with advantage so as to avoid confusion on this matter. Among the fruit culturists, the term pollination is often applied to designate all the influences concerned in the setting of fruits; and the term fertilization is often given the same significance. In botanical usage, however, pollination means simply transference of pollen grains to the stigma, while fertilization is the fusion of the male element from the pollen with the female element in the ovule, and therefore, conveys the idea that, prior to this fusion, the stigma has to be pollinated and the male element must reach the ovum through the pores in the stigma. Cases, however, may occur where these two stages previous to the fertilization may take place and stimulate the pistil to grow and yet the actual fusion may not eventuate producing seeds destitute of any of embryo. The coconut fruits known as "barren" "imperfect," "male," "man" or "seedless" coconuts are probably a result of such a phenomenon. Such nuts have been observed by me in India and Burma, have been recorded from Jamaica (¹⁶) and British Guinea (³), and probably occur in most places where coconuts are grown. They can usually be distinguished from others by being narrower, and inside have shell-substance and a cavity and sometimes even a diminutive nut with or without some kernel, but no embryo. Apparently the stimulus of pollen is not even necessary for such a development in coconuts, for Bailey (⁴) has written that "Coconuts, like many other fruits, often grow to a considerable size without pollination, and then perish." It must not be ignored, however, that a fruit without an embryo may be the consequence of actual fertilization, but that it does not contain any embryo, because the embryo ceased to grow soon after the fusion of male and female element in the ovule without thereby arresting the development of the fruit. A comparative study of these abnormal coconuts and normal ones from Jamaica made by Kupfer (¹⁶), indicated that the substance which usually goes to the formation of seed was, in the case of seedless nuts, devoted to increasing the bulk of husk. "Since no trace of fungus, insect, or bacterial activity could be found, no direct evidence as to the cause of the condition of the defective fruits could be produced. The probability is, however, that the responsibility for this state of the fruiting organs is to be laid against none of these agents, but is the result of the failure on the part of flower to effect pollination."

Some coconut trees produce "male" nuts habitually in all seasons of the year and others in certain seasons only of every year

or after a number of years; and still others do not produce male nuts at all or produce only this kind of fruit all their life. Might not this quality be associated with hereditary factor? In many plants, for instance, the production of sterile pollen grains and ovules is due to an inherent factor, though influences such as climate may modify these qualities to a slight extent. On the other hand, there is the possibility that the inability of ova being fertilized lies in the fact that the nutrition is defective; for it has been shown by experiments that weak and poorly nourished orchard trees often produce ineffective pollen, or unfavourable weather conditions cause great losses by preventing the proper maturity of the pollen or pistil. Aldaba (¹) has shown that desiccating influences reduce the vitality of pollen, while it is a matter of common belief among planters that heavy downpours of rains excessive cold, heat and winds, or prolonged droughts interfere with setting of nuts.

When it began to be realised by coconut planters that ordinarily fertilization was necessary to produce coconut fruits, it was customary to consider all the female flowers, even when they were not ripe to receive pollen, as fertilized or at least pollinated flowers. Thus in 1898 the late J. M. de Sa (²⁰), then a District Administrator of the Village Associations of Goa, wrote in his book "*O Coqueiro*" that he had seen pollinated or fertilized flowers even in unopened spathes; and the same idea was repeated about 1½ years later by L. C. Brown (¹), late Inspector of Coconut Estates in the F. M. S. in a communication made to Mr. H. H. Smith, the senior author of the *Counsels of the East*. On this view Fredholm (⁹), who, as far as I am able to make out, was the first man to correct the view, remarked thus:—"But when you state that pollination takes place to a certain extent before the actual full opening of the sheath, so that young fruit, which may or may not properly set, is observed half-formed as soon as the flower-spike comes into view, then you are wrong. You have evidently mistaken the female flower bud for the young fruit (the fertilized ovum). In this plant in-breeding is so exceptionally well guarded against that it is well-nigh impossible, the pollen grains and the ovules of one and the same inflorescence never arriving at maturity simultaneously. On this point I write, in my articles, as follows:—In-breeding or close-breeding is guarded against as much as possible in nature. It is prevented, in the case of the coconut palm, by a difference in the time of expansion of the male and female flowers on the same spadix, and as a palm rarely has more than one inflorescence at a time with open flowers, the pollination of the female flowers is generally brought about by pollen from the staminate flowers of another palm. Thus cross-pollination is the rule. The pistillate flowers do not expand before the staminate of the same spadix have shed their pollen and fallen out. Until that time the gynaecium remains completely covered by the perianth leaves."

Observations made by various other investigators such as Petch (¹⁴) in Ceylon, Sampson (²¹) in India, and Jepson (¹³) in Fiji, confirmed those of Fredholm's. But though the conclusions

of Fredholm appear to hold good in most of the countries where coconuts are grown, they are not universally true. Not only is there the possibility of exceptions occurring in places where normally the female flowers open when all of male flowers have been shed ⁽¹⁰⁾, but in certain places as in the warm, humid lowlands of Malaya "the female phase not only begins, but most frequently ends before, or at the same time as, the male phase, thus rendering self-pollination the rule instead of being an occasional chance occurrence ⁽¹²⁾." Messrs. Jack and Sands from whom the above quotation is taken have succeeded in obtaining fruits by bagging an unopened coconut inflorescence, and my observations on the dwarf varieties in the Botanic Gardens, Singapore, lend support to their conclusions. This behaviour of the palms in the F. M. S. may be due to some hereditary qualities; but is also possible to attribute this variation in the anthesis of coconut flowers to climatic conditions and the fact that Van der Wolk ⁽²⁴⁾ has shown that the ripening of female flowers is hastened by covering them with black paper so as to reduce light and warmth, may be invoked in support of this

The mode in which the coconut flower presents its stigma for the reception of the pollen is quite different from that of most of our garden flowers. In the latter the petals become loose as the stigma matures, open out exposing the stigma and then after a time wither and drop off. Such however, is not the case with the members of the perianth of the coconut flower. They never drop off unless the ovary or the fruit itself is detached and when young they form a very tight case in which the pistil is protected. The perianth leaves grow extremely slowly attaining the final length of about two to three centimetres, whereas the pistil inside grows comparatively at an enormous rate so that it forces them apart and extrudes the stigma-bearing region, on the ripening of which the stigmatic grooves become exposed to receive pollen. There is a secretion of nectar both from these grooves as well as from the region surrounding them. The period during which the female flower remains receptive varies in different places. At Akvab ⁽¹⁰⁾ and at Peradeniya ⁽⁴⁴⁾, for instance, it is about 24 hours, while in Los Banos ⁽¹⁾ and Singapore it is about 2 to 3 days.

Biology of Pollen.

Pollen grains of the coconut are spherical and smooth, without any apertures, but on exposure of a few seconds they turn ellipsoidal with a single meridian groove or suture which, according to Kerner ⁽¹⁴⁾, is characteristic of palms. On wetting the grains resume their original shape, the longitudinal fold disappearing. This groove seems to point out that coconut pollen belongs to the type adapted to be transported by insects rather than to the type easily wafted by winds. There are two kinds of pollen grains, fertile and infertile, the latter are about half the size of the former. Aldaba's ⁽¹⁾ countings show that infertile pollen grains vary in the

Philippines from 3 to 33 per cent, but in Singapore the abortive grains appear to be very few.

It is the general belief that pollen grains of palms, when kept in dry condition, retain their fertilizing properties unimpaired for a very long time so that they can be exported to distant countries for the purpose of pollinating certain varieties which are desired to be crossed, and Kerner (¹⁴) quotes a tradition which says that the pollen of Date-palms together with that of Hemp and Maize, can be used effectively for artificial pollination even after a lapse of eighteen years. Hence I made pollen culture in cane sugar solutions to ascertain whether there was any possibility of female flowers being fertilized in nature with the pollen from the same inflorescence. At the time I started my studies I had come across only a few exceptions at Akyab where female flowers ripened before the male flowers in the same inflorescence had finished shedding their pollen, but had not seen the paper by Aldaba on the subject, nor did I know of the studies made by Jack and Sands which show that in Malaya self-pollination is the rule rather than the exception. Hence I duplicated many of the results obtained by others. In these studies I obtained the best results with 20% cane-sugar solution, and it was found that every day more and more pollen grains lost their vitality when kept under ordinary conditions till on the seventh day only 3% showed any germination and after that period no grains were seen germinating. Aldaba's (¹) findings show that in Los Banos, 25 to 30% are the best cane-sugar solutions for effecting germination of pollen grains of the coconut, that pollen remains viable for two to nine days, and that pollen grains from different trees do not maintain their viability for the same length of time.

Now we have seen above that in many places the staminate flowers fall off before the stigmas of the female flowers in the same inflorescence become receptive and it is usual among the planters to argue that where this occurs in-breeding or fertilization by the pollen from the same inflorescence is impossible and that emasculation of the inflorescence of which female flowers only are to be used is unnecessary. That this way of arguing is fallacious is shown by the above results which show that pollen may, under ordinary conditions, retain its vitality even for nine days. Added to this there is the danger of female flowers ripening earlier than usual and, thereby, of their getting self-pollinated, thanks to the reduction of light and warmth caused by the bags used to protect the flowers from foreign pollen; for in the above referred experiments with black paper Van der Wolk (²⁴) was able to secure self-pollinated nuts from trees where under ordinary conditions self-pollination was impossible.

When, instead of being kept exposed to ordinary atmospheric conditions, the pollen grains were preserved in celluloid capsules such as are used in administering quinine powder to patients, and the capsules were coated with melted tallow, a greater percentage of pollen grains were found to remain viable. Sampson (²¹)

writes in his *Coconut Palm* that coconut pollen can be preserved for several days in hermetically sealed tubes without losing its vitality. But further investigations in this matter are needed so that a system of artificial pollination may be evolved which will insure the rapid improvement of so important a crop as the coconut. It should also be such as to render it easy for planters to know not only the maternity but also the paternity of the seeds chosen. "If pollen grains are wetted," writes Sampson (²¹), "they at once assume a rounded shape and commence to disintegrate within the space of two or three hours. It is thus evident that, in the moist tropical climate which favours the growth of the coconut palm, there is no chance of the shed pollen grains remaining dormant till the female flowers are open and receptive." We have seen that when exposed to ordinary conditions in a laboratory in Singapore pollen remained viable for even seven days. But to test how long the vitality of pollen may remain when it is exposed to an atmosphere saturated with moisture, some was dusted on to a slide kept on a cell and put into a closed petri dish partly filled with water. It was found that had after 6½ hours exposure to such saturated atmosphere the pollen had not lost its vitality, but after 12 hours exposure to such conditions more than 75% of the grains had lost their vitality.

Pollinating Agents.

In most countries, as has been explained above, there is very little chance of the female flowers being fertilized by the pollen from the same inflorescence. This means, therefore, that they have to depend for pollen upon other inflorescences, either from the same tree or from others. The chances of obtaining pollen from an inflorescence on the same tree are very much reduced by the fact that it is only occasionally that a fresh inflorescence opens before the previous one has finished flowering, and this in spite of the vigour and prolificness of some trees. This means that a large number of female flowers have to depend for their pollen on other trees. This explains why in most countries there is so much variation in the seedlings raised from the nuts of the same tree or even from the same inflorescence, when seedlings raised from dwarf coconuts of Malaya where cross-pollination is an occasional chance occurrence behave so like their parent palms (¹²).

Since the stamens and pistils are borne in separate flowers, the pollination in nature can only take place with the pollen brought by winds, or by insects and other creatures that are attracted to them because of their peculiar scent, colour, nectar etc. Knuth (¹⁵) remarks that the coconut is pollinated through the agency of wind, but quotes Fr. Dahl who noticed the birds *Charmosyna subplucens* Sel., *Cinnyris frenata* S. Mull. and *C. corinna* Salvad. as the frequent visitors of coconut flowers in the Bismarck Archipelago. According to Petch (¹⁶), pollination is effected chiefly by bees and hornets in Ceylon, though from the structure of the flower, he admits that the wind may be also responsible for the transference to a great

extent. Hunger states that the coconut is pollinated by wind as well as by insects, and among these figure wasp (*wespen*), bee (*bein*), fly (*vliegen*), beetle (*kevers*), and ant (*mieren*). Aldaba (¹) working in the Philippines found so little pollen carried by wind from one tree to another that he attaches very little importance to cross-pollination by this agent. The principal insects observed by him as probable pollinating agents are the house fly (*Musca domestica* Linn.) several species of *Lucilia* (Diptera), *Vespa luctuosa* Sauss., *Sarcophaga* sp., *Rhynchium atrum* Sauss., *Apis indica*, *Trigona biroi* (Hymenoptera) and *Prionocerus caeruleipennis* Perty (Coleoptera). Sampson from the peculiar structure of the flower and the honey glands infers that nature has intended that the coconut flowers should be fertilised by the aid of insects. Burkill (²) has noted *Apis dorsata* and *A. indica* on coconuts in Singapore, but remarks that this genus is often found in the Malay Peninsula on palms overwhelmingly "on male flowers, or on flowers in their male stage, obtaining food without giving what would seem to be an adequate return" and that only *Apis indica* has been seen behaving in that manner in Singapore. The observations of Jack and Sands (¹²), on the pollination of coconuts in the Malay Peninsula are of unique interest. "In three unopened inflorescences which were bagged in muslin bags, self-pollination was effected naturally and fruits were formed, while in three other inflorescences which were emasculated immediately on opening, no pollination took place and no fruits were formed, though the female flowers behaved normally and although male flowers on adjacent trees were in full bloom. In a similar connection, it has been observed that odd isolated coconut trees growing even under bad conditions produce fruit so that self-pollination must take place. When coconut flowers are in full bloom, at about 10 a.m., when the dew has dried up and when the gentle breezes frequently begin, clouds of pollen can be seen floating away in sunlight. In a very slight breeze these pollen clouds do not travel far owing to the weight of the pollen but it is highly probable that with the strengthening of the breeze as the day advances the pollen clouds are carried to considerable distance and thus cross-pollination is effected." From this it would appear that insects play an unimportant part in the pollination or rather cross-pollination of coconut flowers in the Malay Peninsula. However, as said above, in most countries where coconuts are grown the coconut flowers behave differently. Aldaba's (¹) results support the view held by many planters outside the Peninsula that an isolated tree does not bear fruit if male flowers in the succeeding cluster do not shed pollen during the period when the stigmas of the female flowers below are yet in a receptive condition, and that a tree in a grove under the same conditions bears fruit. Jepson (¹¹) who paid a special attention to the insects beneficial or otherwise to coconuts, after saying that pollination of coconuts in Fiji is dependent on wind and insects, among which he noticed bees and some black hymenoptera, attributes the dropping in many districts of Fiji of female flowers in large numbers, resulting in poor yield, to the

great scarcity of insect life in the vicinity of an open inflorescence. He corroborates his view by the observation that, on estates where bees are present in large numbers owing to artificial rearing or otherwise, the yield of nuts is very remarkable high. On these grounds he advises the planters in Fiji to introduce bees on their coconut estates with the view of increasing their crops.

My own studies on this subject have not been very extensive, but they throw some further light on the various points raised by the previous investigators. Regarding the ant as pollinator Petch (18) writes: "In considering the potential insect visitors to flowers in the Tropics one has always to take into consideration the ubiquitous ant. At first sight it seems possible that this insect may take part in the conveyance of pollen from male to the female flower, especially when the periods of the inflorescences overlap. In that case they might convey pollen from one inflorescence to another on the same tree. But it is improbable that they should convey pollen from one tree to another, because the journeys of this species, as a rule, do not extend to two trees.

"There is, however, a special provision on the female flower of the coconut which more or less effectually excludes ants from the work of pollination. The region below the stigma, almost the whole of the area which is exposed when the female flower opens, bears a large number of pores. When the flower is ripe these exude a quantity of moisture which, at least in fine weather, forms a ring of liquid round the stigma and prevents the ants reaching the latter. It is not uncommon to see a crowd of black ants congregated round the edge of this ring. It is probable that, as is usual in cases of this kind, the liquid contains some sugar, so that the ants obtain what they want without robbing the stigma. In any case, it keeps the ants away from the stigma. The position of these water pores can be clearly seen on the young fruit where they are indicated by small whitish spots. These spots owe their colour to masses of minute crystal which are deposited by the liquid."

In the Botanic Gardens, Singapore, I have not found the secretion in sufficient quantities as to exclude the ant from the stigmas. Hunger has included ants among the pollinators of coconut flowers, and Aldaba admits the possibility of pollination by ants when he presumes the conveyance of pollen by ants as the probable reason for the development of a nut in an emasculated bagged inflorescence. However it may be that the climate of Peradeniya is favourable for the accumulation of the liquid in such large quantities. In places, therefore, like Singapore, where secretion is not in sufficient quantities as to exclude the ant from the work of pollination, it will play an important part particularly with coconuts where male and female flowers ripen together so as to insure self-pollination.

The insects that seem to do yeoman service in pollination or cross-pollination of coconuts in Singapore are some species of *Melipona* (the *dammar* bees), *Apis dorsata*, and some *Muscidae*

principally *Musca* very near *nebulo* (the common, Oriental house-fly), *Lucilia* sp., and *Pynsoma* sp. These were seen visiting freely both the male and female flowers, though the flies seem to engage themselves more in sipping the honey from the female flowers than in feeding on the pollen or honey in the male flowers. *Apis indica* was a rare visitor to the male flowers, but this bee, according to Burkill, does not give an adequate return for the food it obtains from the flowers of palms. Wasps do not appear so useful as the bees in pollination as they visit the flowers mostly for the purpose of preying on the bees and other insects which are usually beneficial to the pollination of palms. *Vespa cincta* was frequently observed hunting insects and only on one occasion it was observed alighting on male flowers. (*Cyrtostomus pectoralis* Hors., was seen but once sipping the honey from the female flowers of a coconut and according to Mr. Chasen of the Raffles Museum, Singapore, *Anthreptes malaccensis* is the sunbird which is almost invariably associated with coconuts in the Malay Peninsula. Various other birds were also seen in the vicinity of coconut inflorescences, but it must be borne in mind that even those birds which possess especial adaptations in their beak for extracting nectar from various kinds of flowers, often visit the flowers for the purpose of capturing insects for their prey and hence the utility of birds in places where there are insects such as bees to pollinate the flowers, is, like that of wasps, doubtful.

My emasculation experiments on dwarf varieties gave results which differ from those obtained by Jack and Sands in the F. M. S. in that I have been able to obtain nuts even though the nearest tree from which pollen could be brought was about 50 yards away from the tree, and though the inflorescences looked sickly and the nectar secretion was reduced because of the injury resulting from the emasculation. Further I have seen nuts developing on those few inflorescences where female flowers became receptive only after the falling of the male flowers. It makes me wonder therefore, whether the failure in F. M. S. to obtain fruit from emasculated inflorescences was not due to the injury resulting from the emasculation or to the absence or scarcity of insect life useful in the pollination of coconut flowers. By keeping unpollinated emasculated inflorescences side by side with the emasculated but artificially pollinated ones it would be possible to throw considerable light on this point.

Influence of Manures.

It is a known fact in horticulture that application of too much nitrogenous manures causes the plants to vegetate at the expense of flowers and fruits, while lime and phosphates tend to divert this energy in the opposite direction, namely to the production of flowers and fruits. Does the same thing occur in coconuts? What manures exert beneficial influence on the flower production in coconuts and what others act detrimentally? Unfortunately coconuts have received very little attention in this line from the in-

investigators and hence our knowledge is at present very limited. We only know that tillage and manures increase the yield and that coconuts require more potash, and probably salt also, than many other fruit crops. However, it must be understood that to study the influence of manures on flower production is not an easy matter in the case of coconuts especially because the immediate effect of manures on estate is often to increase the vegetative growth and to reduce the yield of crops. In making such experiments due consideration has to be given to the fact that the yield in coconuts can be increased in a number of ways, the following being the principal ones:—

1. By the increase in the number of female flowers in each spadix;
2. By causing to grow the spadices that otherwise would have been dormant or abortive;
3. By the rapid production of leaves and inflorescences, due to increase in the number of leaves produced during a given time.
4. By increasing the ability of the ovary to be fertilized even under adverse conditions or increasing the vigour of pollen so that it may be effective in fertilizing the ovum.
5. By reducing the fall of immature nuts due to malnutrition of the plant.

All such points have to be considered in a study of the effect of manures before anything can be definitely said about their influence on the production of flowers. Copeland (?) has shown that in the Philippines the leaves take one and a half years from their first appearance until their full development, and that another one and half years are required for fruits to mature in their axils. This period, no doubt, will vary according to the local conditions; but, at any rate it gives us an idea how long the effects of a treatment will last considering that the present treatment will, to a great extent, determine the nature of the embryonic leaves and inflorescences and, therefore, the future crop. Let us assume by way of illustration, that we have started cultivating a very neglected coconut tree. The first effect of this treatment may be that the suppression of many inflorescences and a considerable improvement in the general aspect of the tree. The next symptom of this treatment may be the reduction in dropping of immature nuts, later on the annual number of leaves produced may increase and with them the number of inflorescences, then the number of abortive spadices may gradually be lessened and lastly it may occur that the inflorescences produced may be longer, bearing a greater number of female flowers. Many of these flowers may at first drop because the palms are too weak to produce a sufficient quantity of good pollen. The various changes may not take place in the order mentioned above; but the illustration will, I think, show the necessity of making very careful records for a number of years and herein lies the chief difficulty of experiments. Judging, however, from indirect evidence it can be said that good treatment does increase the

number of inflorescences on a tree and of female flowers in each inflorescences. Many of the villagers' holdings in Goa are situated at the foot of laterite hills, far away from any human habitations and they do not usually receive any attention from their owners. The coconut trees in such holdings have, as a rule, many spadices aborted, those that are produced have a stunted growth, each bearing ordinarily not more than four or six female flowers; while on holdings which are under a more careful cultivator or near a well or cattle byre the trees produce more spathes and more female flowers in each spadix. Sampson (²¹) is also of opinion that manuring does induce to an appreciable extent, the rapid development of new bunches of flowers, drawing a basis for his assertion from the better behaviour of coconut trees near a dwelling than that of those growing at a distance from where plant food is plentiful in the soil.

C. X. FURTADO.

Literature Quoted.

1. Aldaba, V. C. The Pollination of Coconut—*Philipp. Agriculturist*, X, 1921, pp. 195-207.
2. Anonymous. *Arte Palmarica*. This booklet on coconut cultivation was circulated in the manuscript by the old Jesuits from Goa. In 1814 long after the expulsion of the Jesuits from the Portuguese territories, the Goa Government Press printed it for the public. Since there has been many editions or impressions. I quote from B. F. da Costa's edition of 1872.
3. Anonymous. Male or Seedless Coconuts—*Agr. News*, Barbados, VI, 1907, p. 87.
4. Bailey, L. H. *Standard Cyclopedia of Horticulture*, II, 1917, p. 813.
5. Brown, L. C. Quoted by Smith and Pape, pp. 590-591.
6. Burkill, I. H. Some Notes on the Pollination of Flowers in the Malay Peninsula, *Gardens' Bulletin*, II, 1919, pp. 165-176.
7. Copeland, E. B. Physiology of the Coconut—*Philipp. Agriculturist and Forester*, vol. I, 1911, pp. 44-50.
8. Costa, B. F. da. *Manual Pratico do Agricultor Indiano*. Vol. I, Lisboa, 1872.
9. Fredholm, A. Quoted by Smith and Pape, pp. 591-593.
10. Furtado, C. X. The Coconut Inflorescences—*Poona Agr. Coll. Mag.*, XIV, 1923 pp. 213-221, and Ripening of Coconut Flowers *Agr. Journ. India*, XVIII, 1923, p. 561.
11. Hunger, T. W. F. *Cocos nucifera*, Amsterdam, 1920.
12. Jack, H. W. & W. N. Sands—The Dwarf Coconut in Malaya—*Malayan Agr. Journ.* X, 1923, pp. 4-12.

13. Jepson, F. P. Depart. Agric., Fiji, *Pamphlet No. 16*, p. 3, Suva 1915.
14. Kerner von Maurilaun, A.—*The Natural History of Plants*, English Ed. Vol. II, London 1895, pp. 96 & 99.
15. Knuth, B. *Handbuch der Blumenbiologie*, Bd. III, Leipzig, 1904, pp. 59 and 78.
16. Kupfer, Elsie M., Imperfect Coconuts—*Journ. New York Bot. Gard.*, II, 1901, pp. 69-71.
17. Loyola, J. I. de, *Culturas Indianas*, Orlim, Goa, 1896.
18. Petch, T. The Flower of the Coconut—*Trop. Agriculturist*, XLI, 1913, pp. 449-455.
19. Rangachari, K.—*A Manual of Elementary Botany for India*, 2nd Edit., Madras, p. 415.
20. Sa, J. M. de, *O Coqueiro*, Nova-Goa, 1898.
21. Sampson, H. C., *The Coconut Palm*, London, 1923.
22. Smith, H. H. & F. A. G. Pape, *Coconuts: the Consols of the East*, 2nd Ed. London, 1913.
24. Van der Wold. Quoted by Hunger, pp. 33.
25. Worsdell, W. C., *Principles of Plant-Teratology*, Vol. II, London 1916, pp. 191-192.

BRANCHED COCONUT PALMS AND THEIR FERTILITY.

Apropos of the note on the *Fertility of Branched Coconut Palms* by Mr. Burkill, published on page 1-2 of Vol. III of this *Bulletin*, the following may not be without interest to readers.

Normally one coconut fruit gives rise to one shoot and this in its turn to one stem. It is not infrequently, however, that one meets with wide deviations from this normal phenomenon. A nut, for instance, may on germination, give rise to more than one shoot, each arising from a separate carpel in the nut. The writer has not come across an instance where a nut had more than two fertile carpels: but it must be remembered that the coconut has a trilocular ovary wherein normally two of the locules become abortive. Cases, therefore, may occur where all three carpels may be stimulated to become fertile as in some species related to *Cocos nucifera*. Forbes reports of "a nut with three cells separated by leathery walls." Sampson (16) appears to have seen cases where the septa separating the ovules were hard and not leathery. Forbes, in his article above referred to writes: "I have seen also nuts with cells ranging from four to eight and ten. I send you a rough outline sketch of a tree which has come up from a nut of fourteen cells, all of which germinating, producing a tree with fourteen stems

united at the base." If Forbes' conclusions as to the occurrence of more than three cells in a nut are correct, then the phenomenon concerned might be a case of vegetative multiplication of carpels. If, on the other hand, his conclusions were based merely on the number of shoots that appeared on germination of a nut, then these alternatives are possible (1) that the numerous shoots are due either to the occurrence of polyembryony as in mango, citrus, onion, etc., or (2) to the fasciation of the plumule, or (3) to the monopodial branching with very much abbreviated axis. All these phenomena are loosely described as "branching" although only in the last two cases the true phenomenon of branching occurs. In all other cases, the shoots are distinct individuals, though due to a close adhesion among themselves they may appear to start from single point. The references about the occurrence of polyembryony or more than three carpels in coconuts are not clear, and, therefore, the subject demands further investigations.

The ramification of the main shoot in coconuts is not restricted to the young age only. There are numerous instances where adult coconut palms have branched. The phenomenon concerned in branching palms has been discussed by Mr. Ridley, ⁽¹⁵⁾ the late Director of the Botanic Gardens, Singapore. He appears to hold the view that true dichotomy never occurs in palms. If this view is correct then the phenomenon of fasciation also never occurs in palms, since fasciation and dichotomy are essentially one and the same phenomenon with the difference that, while in the latter there appears only two shoots, in the former they are always more than two. But the view that true dichotomy never occurs in palms is not absolutely true. Schoute ⁽¹⁶⁾ has observed the phenomenon of fasciation in stems of some abnormal palms, and that of "true dichotomy of the stem, as a normal feature, in *Hyphaene*, an African palm. It (dichotomy) arose as follows: 'The apical meristem ceased to grow, and in place of it, at equal lateral distances therefrom, two new ones appeared.' From this it is obvious that there was no division of the apical meristem into two, and yet true dichotomy is present: because the two lateral branches did not arise owing to injury to the stem-apex; because they are not axillary to any leaves; and because an 'angle-leaf' is present opposite the fork as is the case in dichotomizing stems of Cryptogams. Moreover, the two branches bore lateral buds in the axils of every leaf. Velenovsky ⁽¹⁷⁾ has also established by personal observation that true dichotomy occurs in (*Chamaedorea Martiana*." Worsdell ⁽²¹⁾ cites a case where the plumule of the palm *Pinanga maculata* in the Kew Gardens, was branched down to the extreme base, the branches being subtended by a common basal sheath. The case was one where it was not easy to decide whether the phenomenon concerned was a true dichotomy or not.

There is another phenomenon which might be confused with the true branching. On the Noakhally Plantation, Akvab, Burma, I was shown plants which were considered as cases of bud-rot and these plants had their central leaves decaying and in some

cases giving disagreeable smell. Though a special watch was not kept on the plantation for the disease, yet it was customary to kill and burn all such plants that came to the notice of the manager and spray the neighbouring ones with copper sulphate. It was said that the disease was never seen in the Estate on plants older than ten or twelve years and that the cases were always sporadic, the attacked trees never occurring in groups or bearing any definite relation to the old cases. All this information coupled with my observation of the fact that numerous plants showing similar symptoms, escaped the notice of the man in charge of the plantation and that the disease neither killed these untreated plants nor did it seem to spread from these to the neighbouring trees led me to the conclusion that the trouble in question was other than the suspected bud-rot, genuine cases of which disease I never met on the plantation during my six months stay there. Further observations showed that the pathological condition in most cases could be traced as the consequences of the injury to the palm by the much-prevalent rhinoceros beetles. When the injury to the cabbage reached the apex, the latter was stimulated to change its direction of growth with the result that the young leaves produced previous to this change were started to death and started to decay. Now the idea that this change of direction of growing apex could be mistaken for true branching would never have occurred to me were it not for the fact, that, through the criticisms by Petch and Gadd, my attention was drawn to such views entertained by Sharples and Lambourne. The former writers have discussed the matter at sufficient length in the *Annals of Botany*, Vol. 35, July 1923, pp. 445-450, and shown that the cases which are considered as genuine cases of lateral branching by the latter (vide *Annals*, Vol. 36, Jan. 1922) are most probably the ones where a change in the direction of growth of the apical bud from vertical to horizontal is involved.

There is yet another phenomenon commonly called "branching", though strictly speaking it is a case which ought to go under the title of chloranthry or proliferation. It consists in the metamorphosis of an inflorescence shoot and usually the trees start producing these abnormal structures when it is of the age to produce normal inflorescences and it continues to produce them till its death. Ridley, ⁽¹⁵⁾ Petch ⁽¹⁴⁾ Iyengar ⁽¹⁶⁾ and Burkill ⁽²⁾ have discussed this abnormality in some detail. From the perusal of the literature consulted and from my own observations I am led to conclude that these "bulbils", for so they are termed by Ridley, are never persistent, though Forbes, from his observations made in the Cocos Keeling Islands, was inclined to believe them so. No doubt these outgrowths have usually a much longer life than normal inflorescences, or the leaves of the trees. In one case I observed these abnormal inflorescences grew for more than five years. But even if their life was prolonged for more years I do not think they would give rise to the permanently branched palm, at least the phenomenon concerned would be very different from that of the ordinary ramification in palms. (cf. Burkill's paper).

The peduncle that bears these abnormal structures is essentially of the type of the normal inflorescences: clean, and fibrous for a foot or less from the base, while the structure of the branches from the point of fork is of the type of the stem. The peduncle does not increase in size much more than the peduncle of normal inflorescences, and, like the peduncle of normal inflorescences, has a tendency to form absciss layer and separate from the main axis. Some of these bulbils bear minute inflorescences consisting of tiny male florets and no female. In the cases observed by me these flowers were borne by secondary shoots produced on the bulbils. The bulbils do not show any tendency to form roots in artificial media ⁽⁷⁾ & ⁽¹⁰⁾.

Dr. Pulney Andy ⁽¹⁾ has described a monstrosity which consisted in the phylloidy of the greater portion of the female flowers in the spadix, and not of the whole inflorescence itself. Here too "the flower-bud cannot, by such metamorphosis, give rise to ramification in a palm without a true axillary leaf-bud."

Fertility.

In the above discussion it becomes clear that the term "branching" is loosely applied to various phenomena, including some that cannot be classed as branching. And it is possible that the conception that the true branched palms are permanently infertile has originated from the confusion which exists as to the meaning of the term "branched" coconut palms, that is, by transference to others of the conception derived from some special case or phenomena. Otherwise the prevalence of the idea that the branched palms are permanently unproductive is really unfounded.

I have seen a coconut "branching" at the base bearing fruits; and there are numerous references which show that branched coconuts are not infertile. Morris, ⁽¹¹⁾ for instance, reports a fruit in the Kew Museum from a branched coconut tree of the Fiji Islands. According to Scott, ⁽¹²⁾ there was a tree in the vicinity of Calcutta with five fruit-bearing branches. Henry ⁽⁸⁾ makes mention of a coconut tree in the Marquesas Islands, which at the age of eighteen branched into two, both heads starting to bear fruits after two years from the occurrence of the forking. Among these cases there are at least two references which are of interest to Malaya. The frontispiece of the treatise on coconut by Munro and Brown ⁽¹²⁾ is of a coconut tree branching out near the top into five distinct stems, each of which is carrying fruit. The second is of a coconut tree in Penang which had six branches, each of which were "loaded with nuts." ⁽³⁾ Apart from these, the *Consols of the East* by Smith and Pape ⁽²⁰⁾ and Hunger's *Cocos nucifera* ⁽⁹⁾ have photographs of branched coconut palms bearing fruits. In fact considering the presence of the photographs in the above quoted standard treatises on coconut, one cannot understand the reputed prevalence in Malaya of the view that branched coconut palms are sterile.

By this I do not wish to be understood to say that all truly branched coconut palms are productive. Cases may occur where branched coconuts may not start yielding for a very long period; but in such cases, before one can draw conclusions, it has to be ascertained whether the unproductiveness is due to want of proper care, to the fact that the tree has not yet finished branching, or to some other cause.

A very interesting point in connection with these abnormal palms is to know how their progeny behave and it is very astonishing that nobody has yet tried to solve this question. It is not yet known, for instance, whether seeds of these palms will keep true to the abnormal character or return to the character of the parents to these abnormal ones; whether all of the seeds will do so or only a part of them, and how large a part. In carrying investigations in these lines care has to be taken to prevent cross-fertilisation with the pollen from other plants. This will probably be an easy matter with the dwarf coconuts in Malaya where normally the male and female flowers ripen in a manner as to ensure self-pollination if protected by a bag from foreign pollen. If, however, the inflorescences of these abnormal palms are protandrous, then the female flowers will have to be artificially fertilised with the pollen from the male flowers in the same tree. The branches of palms subject to heavy winds and, therefore, liable to be broken, may be induced to form aerial roots on stems by marcottage and then detached and planted in a place convenient to carry on with the observations. The crown of a palm thus detached has been observed by me to grow when planted out and this practice, it appears, is sometimes resorted to by the gardeners in Malabar, India. (6)

In cases where the inflorescences foliate I have not come across a single reference stating that such trees or their bulhils have borne fruits. In the case described by Dr. Pulnev Andy the tree does not produce a perfect fruit. And probably these are the only two phenomena of the ones described above which are infertile. These cases however should not be confused with the ones where coconut fruits, instead of falling when mature and dry, remain on the stalk and under certain conditions germinate on the tree. Guppy (7) saw a case where a seedling thus germinated was about eighteen inches high.

C. X. FURTADO.

Bibliography.

1. ANDY, P. S.—On Branched Palms in Southern India—*Trans. Linn Soc.* XXVI, (1870) pp. 661-662.
See also J. Shortt's article on the same subject in the *Jour. Linn. Soc. Botany*, Vol XI, (1871) pp. 14-17.
2. BURKILL, I. II.—An Abnormality in the Coconut Palm.—*Jour. R. Asiatic Soc., Straits Br.* No. 69, (1915) p. 15.
3. *Ceylon Observer*, Nov. 7, 1901—Quoted in *Agric. News, Barbados*, Vol I, p. 62.

1. FORBES, H. O.—Notes on the Cocos Nucifera—*Jour. Botany*, XVII, (1879) pp. 193-191.
5. FURTADO, C. X. and BARRETO, P. C.—An Abnormality of Coconut Inflorescence—*The Poona Agric. College Magazine*, XII, (19) No. 2, p. 81-82.
6. FURTADO, C. X.—Vegetative Reproduction in Coconuts—*The Poona Agric. Coll. Mag.* XV, 1922, pp. 141-146.
7. GUPPY, H. B.—*Observations of a Naturalist in the Pacific*, London, 1906, Vol II, p. 472.
8. HENRY, C.—*Internat. Rev. of Sci. and Pract. of Agriculture*, Rome, (1920), No. 1088.
9. HUNGER, F. W. T.—*Cocos nucifera*, Amsterdam, 1920, p. 218, pl. LIX.
10. IYENGAR, M. O. P.—Note on a Bulbiferous Coconut Tree from Malabar—*Jour. Indian Botany*, Vol. III, (1923) pp. 289-291.
11. MORRIS, D.—On the Phenomenon Concerned in the Production of Forked and Branched Palms—*Jour. Linn. Soc. Bot.* XXIX, (1892) pp. 281-298.
12. MUNRO, R. W. and BROWN, L. C.—*A Practical Guide to Coconut Planting*, London, 1916.
13. PETCH, T.—Abnormalities of the Coconut Palm—*Ann. Roy. Bot. Gard. Peradeniya*, Vol VI, (1915-17) pp. 25-29.
14. PETCH T. and GADD, C. H.—The Replacement of the Terminal Bud in the Coconut Palm. *Annals of Botany*, XXXVII, 1923, pp. 445-450.
15. RIDLEY, H. N.—Branching in Palms—*Annals of Botany*, Vol XXI, (1907), pp. 415—See also Worsdell's Teratology, Vol I. pp. 109-111.
16. SAMPSON, H. C.—*The Coconut Palm: The Science and Practice of Coconut Cultivation*, London, 1923. pp.
17. SCHOUTE et VELENOSKY—Quoted by WORSDELL, *Op. Cit.* pp. 85 et 90.
18. SCOTT J.—*Gardeners' Chronicle*, Vol. L, pt. I (1874) p. 118
19. SHARPLES, A., and LAMBOURNE, J.—Observations in Malaya on Bud-rot of Coconuts. *Annals of Botany*, XXXVI, 1922, pp. 55-70.
20. SMITH, H. H. and PAPE, F. A. G.—*Coconuts: The Consols of the East*, London, 1913, p. 424.
21. WORSDELL, W. C.—*The Principles of Plant-Teratology*, Vol. I, London, 1915, pp. 109-111.

A CHINESE BELIEF REGARDING PHYLLOCACTUS HOOKERI, WALP.

It is not possible that *Phyllocactus Hookeri*, a Brazilian member of the Cactus family, can be a plant which was treasured in China in the time of the Sung Dynasty (960 to 1278 A. D.); but from information very kindly supplied to the Gardens by Mr. Tan Tang Niah, J. P., President of the Hong Cheng School in Singapore, it seems that in his native Amoy it is now identified with the "Kheng-fa" plant of the Chinese classics.

"The Kheng-fa was held a very precious plant in the time of the Sung dynasty, and there was known but a single individual of it which grew in the Hau-tho-chhi temple in Yang-chow, where, they said, it had been planted during the Tang dynasty (618 to 954 A. D.). Its leaves were by report tender and smooth, with a shining brightness, and its petals thick and pale yellow. Its fragrance was exceptionally sweet. This treasure the emperor Yan-chung, of the Sung dynasty, removed to his forbidden garden, where after a year it showed symptoms of death: but when it was taken back to Yang-chow it revived. Finally during the Chi-yuan years of the Yuan dynasty which followed the Sung dynasty it withered and died. A priest Kam-yu-sui planted in its place a Chu-pat-sin plant; and so during this dynasty what was known as the Kheng-fa was in truth the Chu-pat-sin."

Now, let it be remarked that at the end of the Sung dynasty the chief occupation of the Taoist priesthood in China was a search for medicinal herbs which would bestow immortality: and it is reasonable to consider the above story as connected therewith.

Mr. Tan Tang Niah flowered the plant of *Phyllocactus Hookeri* that he had received from Amoy, in May 1922. Since then others have obtained *Phyllocactus* plants in Singapore, who offer the flowers as a drug of immense value. In their belief of its value is probably another echo of the long-ago search for a drug bestowing immortality.

A medicinal value of any kind however is extremely questionable; and the repute of it rests in all probability on no more than the plant's slow growth.

I. H. BURKILL.

CLEOME CHELIDONII, LINN. F., IN THE MALAY PENINSULA.

In the larger towns of the Malay Peninsula Chinese are to be found who prescribe various fresh herbs to such sick as may consult them; and recently in the shop of one of these in Penang two species of *Cleome* were detected by Mr. Mohamed Haniff, the owner distinguishing them as "lek tau chhau" and "it tau chhau." The first proved to be *Cleome viscosa*, a plant whose virtues are known in the East. The other proved to be *Cleome chelidonii*;

and a critical examination of the herbarium material preserved in Singapore showed that it is not a new-comer to Penang, for it was collected by Mr. C. Curtis in that island at Pulau Tikus in 1893, and had been obtained previously in 1890 at Prai in Province Wellesley.

Cleome chelidonii occurs in India from the Santal hills, Orissa and Gujarat, southwards, as a weed by no means uncommon. It is found also in Java.

It is possible that it has reached Malaysia by the agency of man: but whether that be so or not, it must now be added to the lists of Malayan plants.

I. H. BURKILL.

OBSERVATIONS ON THE EXPANSION OF *DICTYOPHORA INDUSIATA*, DESV.

Though there are excellent accounts of Phalloids from Ceylon and Java, so that probably nearly all the species are known, very few observations have been made in Malaya, and in the literature at the writer's disposal there is no detailed account of the expansion of *Dictyophora indusiata*, one of the commonest tropical species. Fischer, in his account of the group in Engler's *Pflanzenfamilien* (Teil I, Abt. 1** p. 278), records that the maximum rate of expansion observed was 5mm. in a minute (in Brazil); C. G. Lloyd (*Synopsis of the known Phalloids*, Cincinnati 1909) records an observation of 4 cm. in a minute. The present writer recently had the opportunity of observing the expansion of this species, and the notes made appear to be worth placing on record.

Petch (*Ann. R. Bot. Gard. Peradeniya* Vol. IV pp. 145-151) states that at Peradeniya he could always find specimens fully expanded with the veil still rigid between 8 and 9 a.m., and suggests that expansion probably takes place about 6 a.m., the time of maximum humidity there. Möller in Brazil found expansion to occur between 2 and 7 a.m. In Singapore the time would appear to be as in Ceylon, or occasionally even later. On one occasion fully expanded specimens were found at 8 a.m. but those on which the observations here recorded were made expanded between 8 and 9 a.m.

On May 30th at about 8.15 a.m. my attention was called to three specimens growing on bare ground in a shady place near the Gardens Office. Their condition at this time was as follows:

- A. Stalk elongated but veil not yet expanded, the edge just beginning to free itself below the cap.
- B. A smaller specimen, in a slightly earlier stage of development, the veil completely hidden by the cap.
- C. An unbroken egg.

These were brought into the laboratory and supported in earth under a bell glass. During this operation the edge of the veil of A continued to expand, even though for a few minutes it was lying on the bench. The early stages of expansion were observed in the specimen C, and the later stages in A. and B. C did not properly complete its development. The complete history given in the following paragraph was therefore not observed in a single individual.

After the egg had broken at the apex, the splitting of the volva continued slowly. After about 20 minutes the cap was protruding slightly and the egg was split nearly to the base. Then suddenly the stalk began to expand, growing to a length of about 10 cm. in about 15 seconds. Unfortunately the observer had no time to make an accurate measurement of the time taken in this process, which was exceedingly rapid. Extension continued gradually till about 30 minutes later the total length was about 15 cm. During this period the edge of the veil began to expand slightly from underneath the cap, extending downwards at most 5 cm. Specimen C did not expand beyond this point, the inner surface of the cap not freeing itself properly from the folded veil. In specimens A and B, when the edge of the veil had slightly unfolded, the cap began to move, owing to the further extension of the portion of the stalk above the point of attachment of the veil (hidden by the cap). This extension was from 2 to 3 cm. and in specimen B was complete in two minutes. The extension was accompanied by slight movements of rotation, as if the cap were consciously wriggling to set itself free from the veil. When the extension was complete the folded mass of the veil was completely exposed, and began at once to expand. The unfolding process occupied about 20 minutes in both A and B, the veil reaching down quite to the surface of the soil in which the bases of the eggs were embedded. The total time of expansion was therefore about 70 minutes, possibly as much as 90 minutes, from the breaking of the egg to the complete unfolding of the veil.

The gleba was quite dry when the cap first appeared, and gradually became viscid during the course of expansion. At the same time the veil beneath the cap gradually became separated from it. In specimen C it was observed that in those parts where the under surface of the cap remained adhering to the veil the gleba on the upper surface failed to liquefy: possibly the same source which provides water for the liquefaction of the gleba also causes a wetting and consequent lubrication of the surfaces of contact of the veil and cap, allowing of their separation.

The exceedingly rapid expansion of the fructification is made possible by the mesh structure of the wall of the hollow stalk; the process must be regarded as in the nature of the expansion of a spring which has been placed under pressure and then released. The pressure is presumably due to the turgidity of the cells of the stalk and veil. It is obvious that no further water can be supplied to these cells during the process

of expansion, and it is therefore essential that expansion should take place rapidly and in a humid atmosphere. Under the bell jar the veils remained fairly rigid for three or four hours, and the stalks for 24 hours.

R. E. HOLTUM.

MOSQUITO LARVAE IN THE PITCHERS OF NEPENTHES.

In the *Journal of the Straits Branch, R. Asiatic Society*, No. 22 p. 430 (1890) Mr. H. N. Ridley published a note stating that he had observed mosquito larvae in the pitchers of *Nepenthes ampullaria* growing in the Gardens Jungle, and that he had reared some of these to maturity in the pitcher. This was probably the first record of such an occurrence. The fact was subsequently confirmed by Mr. Percy Groom (*Annals of Botany* Vol. 7. p. 231). The presence of digestive enzymes in the water contained in the pitchers makes it remarkable that the larvae are able to develop to maturity in such a medium. It is perhaps noteworthy that the pitchers of *N. ampullaria* have a small lid which is bent back, so that more rain water is able to enter than into the pitchers of some other species; this additional water would cause a dilution of the enzymes present. However, Mr. Burkill has observed on Penang Hill that mosquito larvae are easily found in the large lidded pitchers of *Nepenthes albomarginata*. In the paper quoted in the next paragraph there is no reference to the species of *Nepenthes* concerned.

Since Mr. Ridley's observation there have been numerous similar records, and in a recent number of the *Bulletin of Entomological Research* (Vol. 14 pt. 1 pp. 1-2) Mr. F. W. Edwards gives a list of species of mosquitos which have been found breeding in *Nepenthes* pitchers in the Oriental Region. Most of the records are from the Malay Peninsula and the total number of species is sixteen. A new record in this paper is the collection of *Megarhinus metallicus* in *Nepenthes* pitchers on Cameron's Highlands by Dr. H. P. Hacker.

R. E. HOLTUM.

THE FLORAS OF THE MALAY PENINSULA, BORNEO AND THE PHILIPPINE ISLANDS.

Volumes 1, 2 and 3 of Mr. H. N. Ridley's *Flora of the Malay Peninsula* (London, 1922—1924) have appeared, and volumes 2 and 3 of Mr. E. D. Merrill's *Enumeration of Philippine Flowering Plants* (Manila, 1923). Further the latter's *Bibliographic Index of Bornean plants* (*Journal of the Straits Branch of the Royal Asiatic Society*, special number, 1921) is available. With these

three a comparison of the natural orders of the Dicotyledons as they occur in the Malay Peninsula, in Borneo, and in the Philippine islands becomes possible; and the following count of the species within them has been made. The sequence of the enumeration is Mr. Ridley's: differences in limits as regards the orders are sufficiently brought out in the column of ordinal names. As the northern end of the Philippines is in the latitude of Calcutta, and the southern in that of Taiping i.e. 5° N., differences are to be expected due to their northward extension, the Peninsula for the purpose of the Flora not going further north than the 7th. degree: also because cultivation has in the Philippines a longer continuous history, they are fuller of weeds than the Peninsula and than Borneo. The total number of Dicotyledons enumerated, for the Malay Peninsula by Mr. Ridley is 4832: by Mr. Merrill for Borneo 3345, and for the Philippine islands 6074. These proportions are nearly 4: 3: 5. Exclude from the Philippine figure the balance over and above the Peninsular figure and the remainder may be regarded as the true Malaysian Flora, which spreads through the three with genera in general in common, but species diverse. Its focus is in Borneo, where the Dipterocarpaceae and Nepenthaceae are in the largest numbers. But the low total of 3345 for Borneo is an indication of a very large amount of collecting yet to be done in that island. In the list clarendon type and italics are used to call attention to totals which are widely in excess or deficit of the proportion 4: 3: 5. The result is that:—

1. In the Malay Peninsula 22 orders have more than their proportion of species:—Violaceae, Flacourtiaceae, Guttiferae, Olacaceae, Celastraceae, Staphyleaceae, Anacardiaceae, Connaraceae, Hamamelidaceae, Anisophyllaceae, Combretaceae, Cornaceae, Ebenaceae, Asclepiadaceae, Apocynaceae, Loganiaceae, Scrophulariaceae, Lentibulariaceae, Acanthaceae, Lauraceae, Proteaceae, and Santalaceae:

2 In Borneo the following 18 have more than their proportion of species:—Dilleniaceae, Menispermaceae, Hypericaceae, Dipterocarpaceae, Gonostylaceae, Linaceae, Ochnaceae, Illicaceae, Ampelidaceae, Melastomataceae, Cucurbitaceae, Ericaceae, Epacridaceae, Sapotaceae, Rafflesiaceae, Nepenthaceae, Casuarinaceae and Cupuliferae:

3. The Philippine islands have more than their proportion of the following 30:—Ranunculaceae, Anonaceae, Berberidaceae, Pittosporaceae, Malpighiaceae, Balsaminaceae, Rutaceae, Simarubaceae, Burseraceae, Meliaceae, Sapindaceae, Rosaceae, Saxifragaceae, Samydaceae, Begoniaceae, Araliaceae, Compositae, Lobeliaceae, Vacciniaceae, Primulaceae, Boraginaceae, Solanaceae, Labiatae, Polygonaceae, Piperaceae, Monimiaceae, Hernandiaceae, Thymelaeaceae, Loranthaceae and the Urticeae of the Urticaceae.

In the following five orders, which are proportionally most numerous in Borneo, the Philippine islands are relatively poorer than the Malay Peninsula:—Dilleniaceae, Dipterocarpaceae, Ochn-

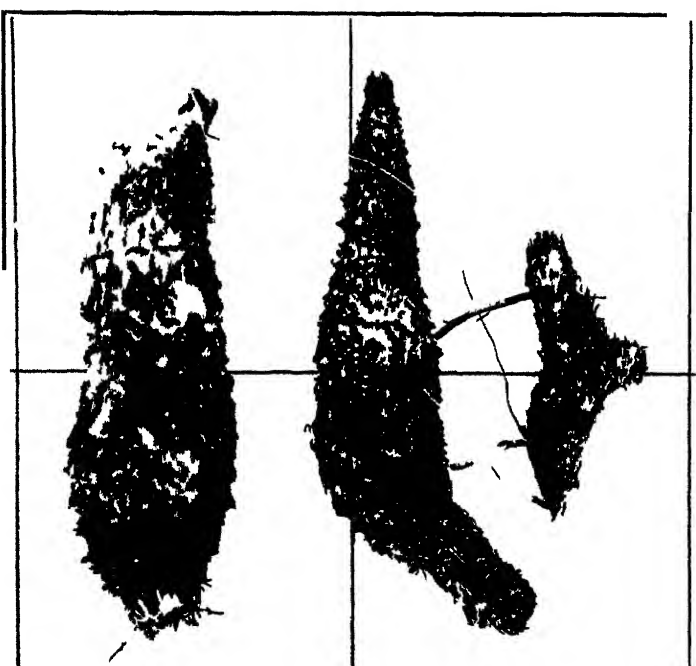
aceae, Nephenthaceae, and Cupuliferae: whereas in only the numerically small Gonostylaceae is the Malay Peninsula relatively poorer than the Philippine islands. These are indications of the closer affinity, well known, of the flora of Borneo to that of the Malay Peninsula than to that of the Philippines.

	Malay Peninsula	Borneo.	Philippine Islands.
1. Ranunculaceae	3	4	12 Some Northern types in P. I.
2. Dilleniaceae			
without Saurauia	25	30	18
3. Magnoliaceae	11	4	10
4. Winteraceae	2	2	3
5. Schizandraceae	3	1	5
6. Anonaceae	81	54	144
7. Menispermaceae	26	26	35
8. Berberidaceae	0	0	2 northern influence
9. Nymphaeaceae	6	3	3 Barclaya absent from P. I.
10. Papaveraceae	0	0	1 weed
11. Cruciferae	1	0	5 weeds
12. Capparidaceae	16	5	24 several weeds
13. Violaceae	21	9	18 Alsodeia weak, but Viola strong in P. I.
14. Pittosporaceae	2	1	15 Pittosporum strong in P. I.
15. Polygalaceae	33	25	22 M. P. strong in Xanthophyllum
16. Caryophyllaceae	1	0	9 several weeds
17. Portulacaceae	2	1	4
18. Hypericaceae	6	7	7
19. Flacourtiaceae			
without Samydaceae	24	7	19
20. Guttiferae			
without Hypericum	73	47	60
21. Ternstroemiaceae	40	50	81 Saurauia strong in P. I.
with Saurauia			
22. Dipterocarpaceae	89	103	50
23. Ancistrocladaceae	1	0	0
24. Elatinaceae	0	0	2
25. Bixaceae	1	1	1
26. Malvaceae			
with Bombacaceae	29	35	54
27. Sterculiaceae	53	37	57
28. Tiliaceae			
with Elaeocarpaceae	73	41	97 Pentace not in B.

	Malay Peninsula.	Borneo.	Philippine Islands.
29. Gonostylaceae	1	5	4
30. Linaceae			
with Erythroxylaceae	5	7	6
31. Malpighiaceae	5	4	17
32. Zygophyllaceae	0	0	1 weed
33. Geraniaceae	0	0	1 weed
34. Oxalidaceae	16	10	7
35. Balsaminaceae	14	6	25
36. Rutaceae	44	19	83 northern influence in P. I.
37. Simarubaceae	8	3	15
38. Ochnaceae	8	19	6
39. Burseraceae	30	24	56 Canarium strong in P. I.
40. Meliaceae	87	52	137 Dysoxylum and Aglaia strong in P. I.
41. Chailletiaceae	8	2	13
42. Olacaceae			
with Icacinaceae	39	24	38
43. Illicaceae	17	16	21
44. Celastraceae	50	14	45
45. Stackhousiaceae	0	0	1
46. Rhamnaceae	20	5	27 B. has but one sp. of 5 genera
47. Ampelidaceae	50	45	67
48. Sapindaceae			
with Accrceae	56	49	127
49. Staphyleaceae	3	1	1
50. Sabiaceae	10	8	18
51. Anacardiaceae	72	34	50 Mangifera strong in M. P.
52. Coriariaceae	0	0	1
53. Moringaceae	0	0	1 introduced
54. Connaraceae	27	14	27
55. Leguminosae	261	174	248
56. Rosaceae	37	24	59 a northern element in P. I.
57. Saxifragaceae	15	8	34 a northern and mon- tane element in P. I.
58. Droseraceae	2	3	4
59. Crassulaceae	1	1	4
60. Hamamelidaceae	5	0	2
61. Halorrhagidaceae	0	2	6
62. Rhizophoraceae	8	8	8

	Malay Peninsula.	Borneo.	Philippine Islands.
63. Legnotidaceae	10	9	8
64. Anisophyllaeaceae	6	3	0
65. (ombretaceae	23	11	21
66. Myrtaceae	149	122	199
67. Melastomataceae	174	171	234
68. Lythraceae, with Sonneratiaceae and (rypteroniaceae	14	7	19
69. Punicaceae	(1)	0	1
70. Onagraceae	7	4	8
71. Samydaceae	20	15	35
72. Turneraceae	2	1	0
73. Passifloraceae	9	6	9
74. Cucurbitaceae	23	28	34
75. Caricaceae	1	1	1
76. Begoniaceae	34	26	89 Begonia strong in P. I.
77. Datisceae	1	1	1
78. Cactaceae	1	0	5 introduced american plants
79. Aizoaceae	3	1	5
80. Umbelliferae	6	5	11
81. Araliaceae	48	22	105 Boerlagiodendron & Scheffera strong in P. I.
82. Cornaceae, with Alangiaceae	17	7	5
83. Caprifoliaceae	5	4	11
84. Rubiaceae	466	333	529
85. Compositae	45	38	142 a northern element in P. I.
86. Stylidiaceae	1	0	1
87. Goodeniaceae	1	2	8
88. Lobeliaceae	2	1	6
89. Campanulaceae without Lobeliaceae	6	4	9
90. Vacciniaceae	20	17	37 Vaccinium strong in P. I.
91. Ericaceae, with Clethraceae	33	55	36 Rhododendron strong in B.
92. Monotropaceae	1	0	0
93. Epacridaceae	1	4	1
94. Primulaceae	0	0	6 northern element in P. I.
95. Plumbaginaceae	1	0	3
96. Plantaginaceae	1	1	2

		Malay Peninsula.	Borneo	Philippine Islands	
97.	Myrsinaceae	95	81	141	
98.	Sapotaceae	61	57	69	
99.	Ebenaceae	50	29	37	
100.	Styracaceae				
	with Symplocaceae	35	25	42	
101.	Oleaceae	28	20	33	
102.	Apocynaceae	120	71	95	
103.	Asclepiadaceae	112	48	113	
104.	Loganiaceae	54	30	45	Gaertnera is absent from P. I.
105.	Gentianaceae	10	5	15	
106.	Hydrophyllaceae	1	0	1	
107.	Boraginaceae	11	3	23	
108.	Convolvulaceae	24	26	59	
109.	Cardiopteridaceae	2	1	1	
110.	Solanaceae	18	11	38	several introduced plants in P. I.
111.	Scrophulariaceae	44	26	45	
112.	Orobanchaceae	2	1	2	
113.	Lentibulariaceae	15	7	9	
114.	Gesneraceae	161	112	135	Didymocarpus strong in M. P.
115.	Bignoniaceae	10	3	19	
116.	Pedaliaceae	1	1	1	
117.	Acanthaceae	168	51	129	
118.	Verbenaceae	75	47	105	
119.	Labiatae	30	19	60	Coleus strong in P. I.
120.	Nyctaginaceae	4	0	8	some introduced plants in P. I. list
121.	Amarantaceae	15	10	22	weeds or of rather N. type
122.	Chenopodiaceae	0	0	3	northern type
123.	Basellaceae	(1)	0	2	introduced plants
124.	Phytolaccaceae	0	0	1	introduced plants
125.	Polygonaceae	9	7	23	northern element in P.I.
126.	Aristolochiaceae	10	6	13	
127.	Rafflesiaceae	2	6	2	Rafflesia only
128.	Nepenthesaceae	10	26	9	Nepenthes only
129.	Piperaceae	83	36	137	Piper strong in P. I.
130.	Saururaceae	0	0	1	a rather northern and pacific type
131.	Chloranthaceae	2	2	6	
132.	Myristicaceae	45	37	40	



“TUBERS OF A STENOMERMIS

	Malay Peninsula	Borneo.	Philippine Islands.
133. Monimiaceae	1	5	17
134. Lauraceae	175	71	110
135. Hernandiaceae	4	7	9
136. Proteaceae	10	3	8
137. Thymelaeaceae	9	9	24
			Wikstroemia strong in P. I.
138. Elaeagnaceae	1	0	1
139. Loranthaceae	46	47	101
			Loranthus strong in P. I.
140. Santalaceae	14	6	5
141. Opiliaceae	4	1	5
142. Balanophoraceae	6	4	5
143. Euphorbiaceae	351	195	385
144. Urticaceae			
Celtideae or Ulmaceae	8	7	13
Moreae	127	116	203
Urticeae	26	46	151
			Elatostema strong in P. I.
145. Juglandaceae	3	1	5
			Engelhardtia only
146. Myricaceae	2	2	3
147. Casuarinaceae	1	3	3
148. Cupuliferae	51	48	47
149. Salicaceae	1	—	1
			not native in M. P.
150. Ceratophyllaceae	—	—	1
	4832	3345	6074

I. H. BURKILL.

STENOMERIS IN THE MALAY PENINSULA.

In 1896, at Gua Batu or Batu Caves, not far from Kuala Lumpur, Mr. H. N. Ridley obtained a scrap of a *Stenomeris* in flower. This scrap he referred to *Stenomeris borneensis*, Oliv., in his *Materials for a Flora of the Malay Peninsula, Monocotyledons*, 2, 1907, p. 85, adding a remark to indicate that he had not material enough to be quite positive of its identity with the Bornean plant so named.

In March, 1922, the writer found sterile in the Bukit Raja forest a Dioscoreaceous plant which is considered to be the species found by Mr. Ridley; and in foliage it agrees with *S. borneensis* as figured in Hooker's *Icones Plantarum*, plate 2328. Its locality was visited again in Oct. 1922, Jan. 1923, Dec. 1923, and Sept. 1924,

without success in finding flowers, and it has been seen sterile at the 11th mile on the Kuala Lumpur—Klang road. It was found again in great abundance in the Pondok Tanjong forest reserve, Perak, sterile, in March 1924. It is disappointing that so far these attempts to make sure of the species have failed.

Its underground tubers are small, and horizontal—they are figured upon the adjoining plate from specimens dug up near Klang. Each consists of two or three internodes of stem tissue, swollen, and covered with weak processes of parenchymatous cells. In the plate the scars of the bracts at the nodes are clearly visible; and their presence is important in that we have by their means proof of the compound stem-nature of the tuber, an observation bearing on the disputed morphology of the underground parts in the allied genus *Dioscorea*.

The tubers of the *Stenomeris* are seen to be formed laterally as branches upon the white half-translucent underground part of the stem. They grow to a length of 2 to 3 inches and themselves give rise, as is seen in the lowest of the five tubers in the left hand half of the plate, to a new half-translucent stem—not from their tip but laterally. It is clear from the plate that this lateral production is a normal event; and it indicates the tubers as resting branches, suggesting that bulbil formation in *Dioscorea* may likewise be called the production of resting branches: or the tubers of this *Stenomeris* might equally be called underground bulbils without much misuse of the word "bulbil." It is interesting, apart from this, that renewed growth is lateral.

The interior of the tuber contains starch, of which only a little was seen; but as it was examined when the stems were in new and vigorous growth, the smallness of the amount is not surprising.

I. H. BURKILL.

A NOTE ON *SEMECARPUS CURTISII*, KING.

It was pointed out to me by Mr. Burkill that in the specimens placed under *Semecarpus Curtisii*, King, in the Singapore Herbarium, there was a difference between those from the North and those from the South of the Peninsula. On examination, it was found that there was a distinct difference, almost enough to admit of a new species being erected, had there not been one plant (Ridley 10566, from Ulu Selangor) which was intermediate between the two forms both in locality and in character.

Semecarpus Curtisii, King,

Curtis 2930, type! Puket, Tongkah, Siam.

Burkill & Md. Haniff, 13318! Alor Star, Kedah

Ridley, 15186! Setul.

Annandale ! Kaw Suan Toon, Siam.

Ridley 10566! Ulu Selangor.

Semecarpus Curtisii, King, var. **brevipetiolata**, n.v.

Holtum 9521! Gunong Tampin, Negri Sembilan.

Alvins 885! Gaong Jalan, Negri Sembilan (or Malacca).

Burkill, 3230! Gunong Tampin, N. S.

Md. Nur, 1623! Bukit Kayu Arang, Tampin, N. S.

differs from typical *Curtisii* in the shorter petioles, which are 1.3 to 2 cm. long, in the glabrous disc of the male flower, and in the absence of white scales on the under side of the leaf, and in the slightly more pubescent panicle, though this is variable.

Ridley 10566 from Ulu Selangor, which I have put into typical *Curtisii*, seems to approach the var. *brevipetiolata* in the pubescence on the panicle, and in the absence of white scales on the under surface of the leaf, but it has a long and not a short petiole. The specimen, however, is a poor one.

Semecarpus Prainii, King

Md. Haniff & Md. Nur 3938! Pungah, Lower Siam.

Kunstler 7112! Larut, Perak.

This species has been omitted from Ridley's Flora of the Malay Peninsula.

M. R. HENDERSON.

NEW RECORDS OF SPECIES OF LYCOPodium FROM THE MALAY PENINSULA.

Since the publication of Mr. Ridley's "List of the Fern Allies and Characeae of the Malay Peninsula" (*Journ. S. B., R. Asiatic Society* No. 80, 1919, p. 139) the following species of *Lycopodium* not there recorded have been collected.

L. clavatum L. var. *divaricatum* (Wall.) This species is cosmopolitan, and the variety *divaricatum* has been found on mountains at various localities from the Himalayas through Malaysia to the Philippines. It was collected apparently for the first time in the Malay Peninsula below Fraser Hill, at an altitude of about 3800 feet, in an open place in a valley which had formerly been cleared for tin mining. (Gardens No. 11303).

L. verticillatum L. fil. Collected by M. R. Henderson at Robinson Falls, Cameron's Highlands, Pahang, 4800 feet. (F. M. S. Museums No. 11730). Distribution: Java and Borneo to Polynesia, Trop. America. South and East Africa, Mascarenes.

L. hippuris Desv. A living plant collected on Gunong Pulai, Johore, in June 1922, by G. A. Best, has since been in cultivation in the Gardens, and is freely fertile; it appears to belong to this species. Unnamed specimens in the Herbarium from Singapore (Sungei Sembawang, Ridley no. 6520) and the Taiping Hills (Long) agree with it. Distribution: Java and the Philippines to Samoa.

R. E. HOLTUM.

ORCHID NOTES

OBERONIA FUNGUM-OLENS,—A NEW SPECIES.

In June 1924 an *Oberonia* was found in some plenty at the foot of the Main range of the Peninsula near Tanjong Malim, which in cultivation in Singapore produced flowers freely in September: it proves to be a species new to the Peninsula and appears to be undescribed. It is here named *O. fungum-olens* from the smell of its flowers being just such as is given out by species of *Fomes* and other similar fungi. The colour of these small but numerous flowers is likewise suggestive of these fungi.

Its affinity is with *O. anceps*, Lindl. and *O. spathulata*, Lindl. which are found rather widely in Eastern Malaysia. Ridley remarks of *O. anceps* that it is "the largest native species" (Mat. Fl. Mal. Penins. Monocots., I, 1908, p. 18); but this new one is larger: so also is *O. spathulata*, which was unrecorded for the Peninsula in 1908.



Flower of *Oberonia fungum-olens*, x 5.

***Oberonia fungum-olens*.**

Caules dependentes, numerosissimi, 10—20 cm. longi, compressi, c. 15-foliati, cum foliis ad 2 cm. lati, internodiis 1 cm. longis vel paullulo longioribus. Folia alternatim bifaria, basi dimidio imbricantia, lateraliter admodum compressa, carina dorsale paullulo incurvata ad 4 cm. longa, marginibus subrectis vix 3 cm. longis, viridissima. Inflorescentia subsessilis, densiuscula, cylindrica, multiflora, ad 12 cm. longa, floribus forsan ad 300, basalibus spiraliter apicalibus verticillatim dispositis, istis serotinis. Rhachis scarioso-puberula, viridi-fuscescens aliquo modo profunde striata, striis tot quot floribus in verticillis. Flores melleo-fusci, fungum-olentes, aperti sepalo dorsale excepto plani, versus folia id est versus coelum respicientes. Sepalum dorsale suborbiculare, c. .75 mm. diametro, extus minutissime puberulum. Sepala lateralalia late ovata, vix 1 mm. longa, apice obtusa, .5 mm. lata. Petala elliptica, obtusa .75 mm. longa. Labellum supra curvatum, basi excavatum; auriculae basales erectae, apice rotundatae, facie minutissime pustulatae, vix 1 mm. longae: lobi duo, irregulare subquadrato-rotundati, 1.5 mm. longi et lati. Gynostemium viride, ambitu triangulari-rotundatum.

Planta epiphytica, ex vivo in Horto Botanico Singapurensi descripta. Origo ejusdem in pede montium prope vicum Tanjong Malim principalii Perak.

A COMPARISON OF COELOGYNE CELEBICA AND C. SPECIOSA.

Coeologyne celebica, J. J. Sm., has recently flowered in the Botanic Gardens, Singapore, at the same time as *C. speciosa* Lindl.; and the opportunity was taken of figuring the flowers of the two side by side. The origin of *C. celebica* was Paloppo in the Island of Celebes; and the origin of *C. speciosa* the Taiping Hills, in the Malay Peninsula.

The first figures below (1 and 1a) are of the flowers of the two seen from above, drawn to show how the petals of *C. celebica* during the course of the life of the flower recurve so that their tips meet, whereas the petals of *C. speciosa* do not do so. The dorsal sepal in *C. celebica* is seen to be narrower than that of *C. speciosa*.

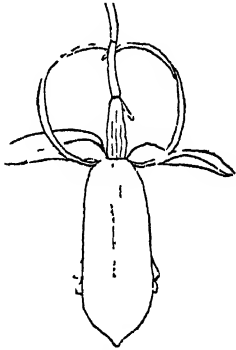


Fig. 1.

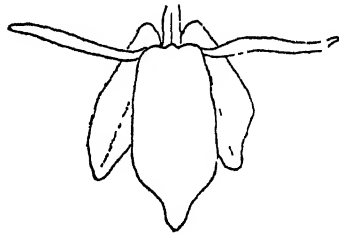


Fig. 1a.

Flowers of *Coeologyne celebica* (left) and *C. speciosa* (right) from above, $\times \frac{1}{2}$.

In the next pair of drawings (2 and 2a) it is shown that the dorsal sepal rises up in *C. celebica* a little more than in *C. speciosa*. The tip of the lip in both is equally curved backwards and cannot be seen in face view in either.

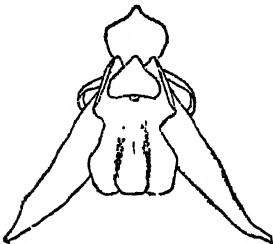


Fig. 2.

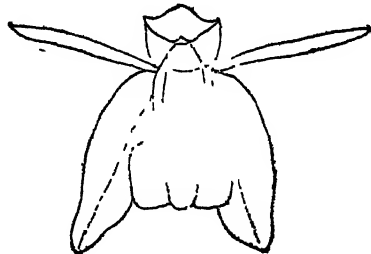


Fig. 2a.

Flowers of *Coeologyne celebica* (left) and *C. speciosa* (right) from in front, $\times \frac{1}{2}$.

There is a slight difference in the gynostemium of the two, as the following pair of drawings show (3 and 3a).

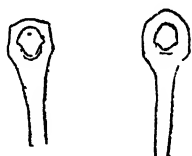
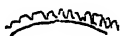


Fig. 3. Fig. 3a.

Gynostemium of *C. celebica* (left) and *C. speciosa* (right), $\times \frac{1}{2}$

There is a very great difference in the crests of the lip. The crest in *C. speciosa* (4a) is continuous with much sinuation: the crest in *C. celebica* (4) is toothed.

Fig. 4.



Crests of the lips of *C. celebica* (above),
and *C. speciosa* (below), $\times \frac{1}{2}$.

Fig. 4a.



The lip of *C. celebica* is marbled with a rich brown: that of *C. speciosa* with purplish black. The rest of the flower of *C. celebica* is yellower than that of *C. speciosa*, wherein there is just the faintest suggestion of the salmon tint found in other species of its genus.

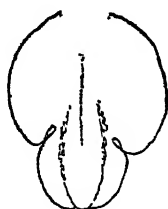


Fig. 5.

Lip of *C. celebica* flattened. $\frac{1}{2}$ nat. size.

Fig. 5 shows the lip of *C. celebica* flattened out.

All figures are half natural size.

DENDROBIUM ALBICOLOR RIDL., IN PENANG.

In the Waterfall valley, Penang, upon a mango tree at a small distance from the gates of the Waterfall Gardens, the above named species of *Dendrobium* has been found. It was described in the *Journal of the Linnean Society of London*, 32, (1896) p. 250, upon specimens obtained by Mr. C. Curtis at Pungah in Lower Siam: and it is possible that he placed it upon the mango tree near to the Gardens, or it is possible that it has been carried by some nesting bird from the Gardens. The annexed drawings illustrate

the flower, which lacks the red spots described in Mr. Ridley's definition.

It is now in great abundance upon the tree.

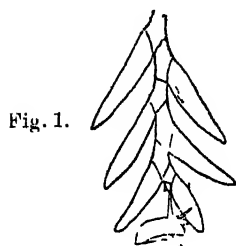


Fig. 1.



Fig. 2.

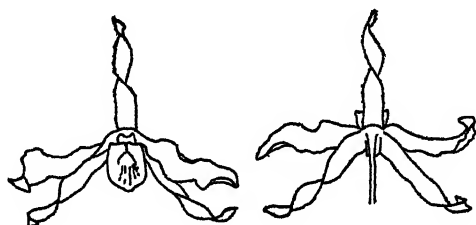


Fig. 3.

- (1) Branch of *Dendrobium albicolor* X $\frac{1}{2}$
- (2) Flower in face view, nat. size.
- (3) The upper half of the flower and the lip flattened, nat. size.

DENDROBIUM HANIFFII, RIDLEY.

Dendrobium Haniffii was obtained by Mr. Mohamed Haniff in Kelantan upon the Labir river, always on branches overhanging the water. It is an epiphyte, with green stem up to 40 cm. long, slightly swollen upwards. The leaves are about 10 cm. long by 1.5 cm. wide. The flowers are many in well-grown plants: their



A flower of *Dendrobium Haniffii*, $\frac{1}{2}$ nat. size.

predominant colour is a very pale pinkish lilac, the sepals and lateral petals being uniformly thin. These are 4.5 to 5 cm. long or a trifle longer; the sepals 7 mm. wide; the lateral petals at the middle 12 mm. wide. The dorsal sepal is twisted on itself as drawn: the lateral sepals, also—all in the same direction: but one of the latter seems to have less tendency in its lower half to twist than its partner. The spur is only 5 mm. long and dull yellow. The lip is folded on itself making a tube 1 cm. long, and in the 1.5 cm. above open upwards and forwards. If laid open entirely, it is as drawn, and is seen to have magenta marks at the base on either side in the positions indicated. There is also a very faint shade of magenta in lines on it.



The lip of *Dendrobium Haniffii*, n t. size.

The cap of the anther is magenta: the column below green passing into the dull yellow of the interior of the spur. Pollen masses are sessile.

I. H. BURKILL.

RAINFALL at the Botanic Gardens, Singapore, during the first half of the year, 1923. Readings taken at 9 a.m. and expressed in inches.

Date	Jan.	Feb.	March	April	May	June
1	.68	—	—	.61	—	1.41
2	.53	—	—	—	—	.87
3	.25	—	—	.19	—	.53
4	trace	trace	.05	1.09	.12	.02
5	.11	—	.07	—	—	—
6	.15	—	.90	—	—	1.25
7	1.88	—	—	—	—	—
8	.71	—	—	—	trace	.03
9	.24	—	—	.01	.64	—
10	.42	.01	—	.06	.10	—
11	.03	—	.63	—	—	—
12	.08	—	—	—	—	.01
13	1.81	—	.01	—	.17	.78
14	—	.36	1.19	1.21	—	.01
15	.43	—	1.52	trace	—	.41
16	—	—	trace	—	—	.34
17	.51	.02	.06	—	.01	—
18	.59	1.28	.18	—	—	—
19	.03	trace	—	.74	—	—
20	—	—	—	—	.19	—
21	1.28	—	—	.35	1.38	—
22	.22	.01	—	.03	.25	—
23	.62	—	.23	.19	.03	.89
24	—	.01	.08	.12	—	trace
25	—	.02	.16	.46	.29	—
26	—	—	.39	.02	.25	.55
27	trace	—	—	.03	trace	.03
28	—	—	—	—	trace	.10
29	—	—	—	—	3.12	.04
30	—	—	—	—	.01	—
31	.01	—	1.40	—	.46	—
Total	10.61	1.71	7.17	5.11	7.02	7.27

RAINFALL at the Botanic Gardens, Singapore, during the second half of the year 1923. Readings taken at 9 a.m. and expressed in inches.

Date	July	Aug.	Sept.	Oct.	Nov	Dec.
1	—	—	—	—	1.23	.46
2	—	—	—	.11	2.17	.73
3	.50	—	—	.04	.02	.56
4	.11	.01	.01	—	—	.26
5	—	—	—	trace	.03	.01
6	.14	—	.16	—	.84	—
7	.46	.63	—	—	.03	1.21
8	trace	—	.01	—	—	.02
9	.03	—	.19	.27	.11	—
10	2.08	.88	—	—	.24	.63
11	.95	.23	.01	.16	.44	—
12	.03	.08	.01	.07	.38	.46
13	.03	—	.02	.01	.01	1.00
14	—	.19	.02	—	—	.03
15	.32	—	.02	—	.07	.21
16	.36	.75	2.87	.35	—	.14
17	—	—	.16	.23	—	.07
18	1.06	.68	—	—	—	.01
19	.02	.08	—	—	—	.66
20	—	—	.79	—	—	.24
21	.21	—	—	.45	—	.01
22	trace	.02	.19	.21	—	—
23	.10	.64	—	—	.06	.12
24	trace	.07	.61	.09	.89	1.61
25	.01	—	.50	.35	.09	trace
26	3.34	—	trace	.11	1.96	—
27	.19	1.19	—	.09	.19	—
28	—	—	.01	—	.41	.07
29	—	trace	—	.04	.02	—
30	—	.12	—	—	.09	.29
31	.31	.36	—	trace	—	.07
Total	10.25	5.93	5.58	2.58	9.28	8.90

RAINFALL at the head of the Waterfall Gardens, Penang, during the first half of the year 1923, in inches.

Reading taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	Jan	Feb.	March	April	May	June
1	—	—	—	.08	.07	.49
2	.52	—	—	.30	.39	—
3	.07	—	—	—	—	1.35
4	—	—	—	—	—	.90
5	—	—	.72	1.25	—	.02
6	.05	—	—	.23	.36	—
7	—	—	—	—	—	—
8	.38	—	.83	—	.19	.31
9	.31	—	1.60	1.17	.89	—
10	.28	—	.33	.03	1.15	—
11	—	—	.02	.05	.27	—
12	—	—	—	.26	.18	—
13	.24	—	—	.03	.20	2.20
14	—	.03	.06	—	.10	.63
15	—	.02	.20	.27	.77	1.79
16	—	—	.07	—	3.24	.87
17	—	2.06	.08	—	.78	—
18	.01	—	—	—	—	—
19	1.73	—	.07	.09	.47	—
20	.03	.04	—	—	.32	—
21	.08	1.27	—	.04	.02	—
22	.19	—	—	1.16	—	.30
23	—	—	—	.09	—	3.84
24	—	—	.20	1.82	.12	.30
25	—	—	—	1.16	1.25	.03
26	—	—	1.53	—	—	—
27	—	—	1.10	—	.65	.19
28	—	.02	—	—	.30	.05
29	—	—	.05	—	1.78	.91
30	—	—	—	—	.10	2.85
31	—	—	—	—	.05	—
Total	4.25	3.14	6.86	8.03	13.65	17.06

RAINFALL at the head of the Waterfall Gardens, Penang, during the second half of the year 1923, in inches.

Reading taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	July	Aug.	Sept.	Oct.	Nov	Dec.
1	—	—	.29	.53	—	—
2	.03	—	.72	4.62	.01	—
3	2.15	—	—	2.86	1.85	—
4	—	.24	—	—	—	.19
5	—	—	.07	.96	.50	.01
6	.30	1.66	.17	.24	.04	—
7	.22	.10	.68	.34	.05	—
8	.02	—	2.70	1.29	.78	.05
9	—	2.36	.27	.37	5.31	.14
10	1.38	.18	2.12	2.24	2.25	1.82
11	1.13	1.47	7.90	1.19	.48	—
12	—	.11	1.15	.11	.05	.05
13	.54	—	.04	.95	.11	.37
14	—	.07	.72	.05	—	.03
15	—	—	.57	.21	.13	.04
16	—	—	1.38	.05	.07	.50
17	—	—	.48	.26	2.16	—
18	.90	.10	—	.26	.47	.03
19	.92	.28	1.55	.03	.03	.57
20	—	—	.13	1.13	.18	.68
21	.28	.39	.55	.07	.61	.03
22	—	.61	—	.07	—	—
23	—	.78	—	.31	.11	—
24	—	.55	.23	2.05	2.30	—
25	—	.15	2.74	.33	—	—
26	—	—	2.30	1.09	—	—
27	—	—	—	1.40	.19	.83
28	.40	.56	—	3.42	—	—
29	—	.23	1.63	1.78	1.33	—
30	—	.26	—	1.83	.79	—
31	—	.03	—	.62	—	—
Total	8.27	10.16	28.39	31.02	20.40	5.34

Relative Humidity of the air at the Botanic Gardens Singapore,
calculated from wet and dry bulb hygrometer readings made
daily at 9 a.m. during the year 1923.

Date	January	February	March	April	May	June	July	August	September	October	November	December
1	100	80	72	81	78	100	85	79	83	83	93	98
2	95	100	85	79	78	87	80	83	79	81	78	91
3	98	78	81	79	78	83	98	85	83	83	89	100
4	90	80	98	81	78	81	79	83	81	78	78	93
5	81	78	83	80	80	84	89	79	79	76	93	79
6	97	81	82	78	80	81	81	83	81	76	100	78
7	98	76	81	77	80	81	95	93	78	76	87	82
8	98	71	75	69	89	89	87	81	78	87	87	76
9	86	71	85	87	100	83	91	87	79	83	91	93
10	83	76	83	76	81	81	98	86	79	76	81	75
11	98	78	83	85	81	87	98	100	81	91	95	79
12	89	77	85	81	79	78	77	83	83	89	91	89
13	87	79	83	83	89	100	89	83	79	76	78	89
14	86	85	81	85	83	85	83	100	95	78	85	87
15	80	85	79	87	77	100	67	83	79	89	85	100
16	86	85	81	79	81	84	91	85	97	79	78	87
17	87	81	76	78	83	83	79	83	81	76	78	87
18	91	88	71	75	78	83	91	100	83	66	80	95
19	85	81	77	85	80	81	78	83	81	76	74	95
20	79	77	77	93	91	80	83	81	81	74	79	91
21	91	85	79	85	78	80	81	85	82	70	75	77
22	83	80	79	80	93	82	81	83	87	78	81	79
23	81	83	79	98	85	93	83	100	81	73	81	83
24	82	83	79	81	76	89	89	79	89	95	72	89
25	79	72	83	89	100	81	85	83	82	74	76	81
26	72	83	79	85	81	100	100	85	81	89	76	83
27	80	81	79	76	93	85	83	83	87	76	76	72
28	82	79	87	85	76	100	81	83	85	73	95	78
29	78		83	—	100	83	83	83	81	78	74	79
30	78		78	79	87	80	81	100	76	76	93	80
31	76		83		95		83	81		72		81
Average	86	81	81	82	84	86	86	89	82	79	83	85

Average for the year 83.8.

SUMMARY OF RAINFALL 1923.

		SINGAPORE.				PENANG.			
		No. of rainy days	Amount of run in inches	mm.	Longest Spell without rain	No. of rainy days	Amount of rain in inches	mm.	Longest Spell without rain
January	...	22	10 61	270	3 days	12	4 25	108	9 } 22 days
February	...	9	1 71	42	5	6	3 44	87	13 }
March	...	15	7 17	135	4	14	6 86	174	4
April	...	15	5 11	130	4	16	8 03	204	6
May	...	17	7 02	178	3	23	13 65	346	3
June	...	17	7 27	184	6	17	17 06	433	5
July	...	22	10 25	260	3	12	8 27	210	6
August	...	16	5 93	150	3	19	10 16	258	3
September	...	17	5 58	142	3	22	28 39	721	2
October	...	17	2 58	66	3	30	31 02	788	1
November	...	20	9 28	235	7	23	20 40	518	2
December	..	23	8 90	226	3	15	5 34	136	5
Total	...	210	81 41	2068	...	209	156 87	3983	...
Greatest amount in 24 hours 3.34 ins. or 85 mm. ..						7.90 ins. or 200 mm.			
Do.	do.	48 do.	3 53 do.	90 mm.	...	10.02 254 mm.			
Do.	do.	72 do.	3 59 do.	91 mm.	...	11.17 283 mm.			
Excessively rainy periods, more than 5 ins. having fallen in 72 hours Nil						5 (Sept., Oct., Nov.)			
No. of days when condition persisted ... Nil						10			
Periods of comparative drought, less than .02 ins. having fallen in 120 hours ... 12						7 (Jan.-Feb., Feb., Apr., June, July, July-Aug., Dec.).			
(Jan.-Feb., Feb., Feb.-Mar., Apr., Apr.-May, June, Aug., Sept., Sept. Oct., Oct., Nov.)									
No. of days when the condition occurred .. 37						7			

* From Jan. 24 to Feb. 13 inclusive (21 days) there was only .02 ins. of rain.

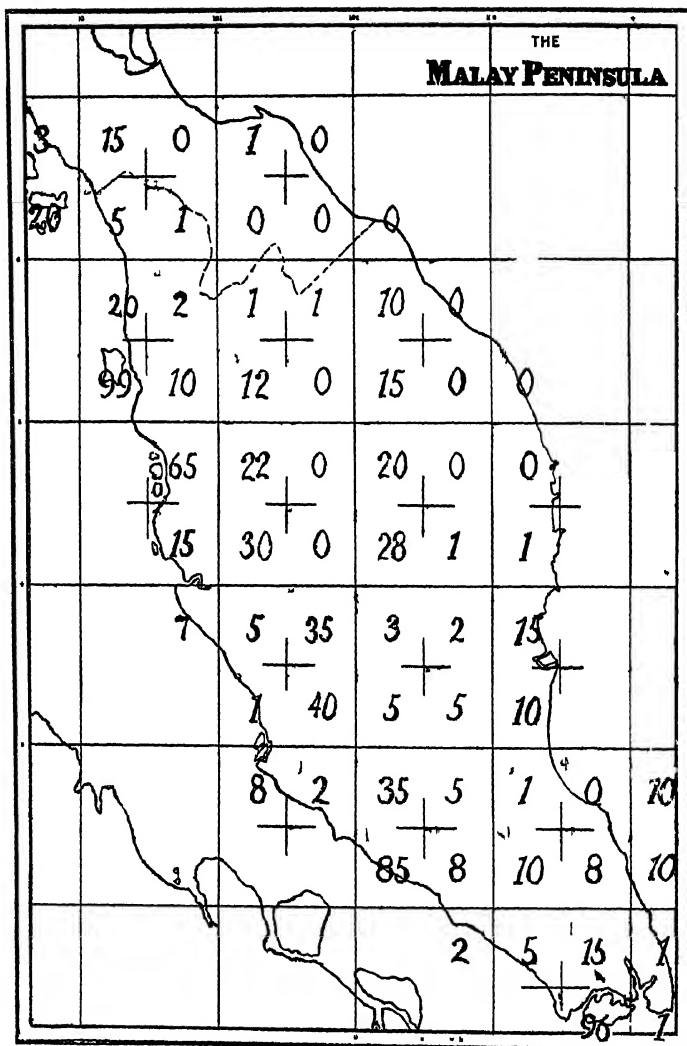


DIAGRAM NO 1

THE GARDENS' BULLETIN, STRAITS SETTLEMENTS.

Vol. III

March, 1925.

Nos. 7—12.

The Flowering Plants of Taiping, in the Malay Peninsula.

By

I. H. BURKILL and M. R. HENDERSON.

This is the first local Flora for any area within the Federated Malay States, and more also: for it gives in a very concentrated form a considerable amount of information about the distribution of the Higher plants in the Malay Peninsula. But it is not the first local Flora for any part of the Peninsula, as two exist. In the year 1894, Mr. C. Curtis published in the *Journal of the Straits Branch of the Royal Asiatic Society*, No. 25, a "Catalogue of the Flowering Plants and Ferns found growing wild in the Island of Penang"; and in the year 1900, Mr. H. N. Ridley, in the same *Journal*, No. 33, published his "Flora of Singapore."

A catalogue of the Flowering plants of the territory of Malacca could be written up from the materials in the Herbarium of the Botanic Gardens, Singapore, and no doubt the time is not distant when it will be.

A few months ago, in order to answer an enquiry, a map of the Malay Peninsula was taken and divided between the lines of latitude and longitude, as opposite, so that squares of approximately 1500 square miles were formed; and for each of the squares an estimate of the number of species likely to occur was made: then the number of species proved to occur was calculated as a percentage of it. The percentages brought up to date have been inserted on the map: they suggest that the flora of the square *2d*, containing the island of Penang and the coast opposite, is that most thoroughly worked up, in as much as the number of the higher plants known to

occur in it appears to be 99 per cent of the probable quantity: the flora of square 9m, containing the island of Singapore and some of the adjacent coasts, comes next at 96: Malacca follows at 85. The best known square of the rest of the Peninsula is 3e, wherein is Taiping, Larut, much of Krian, with the hills, and back to the Perak river at Kuala Kangsar: its figure being 65. The enumeration which follows is for a part only of that square,—the part best known, i.e. the immediate neighbourhood of Taiping: it is of all the higher plants known to occur east of the Taiping-Kuala Kangsar and the Taiping-Batu Kurau roads, which make the western limit, and by curving round, indicate also the southern and northern limits: the eastern limit is along the summits of the Taiping Hills. The enumeration, perforce, stops at these summits, for nothing is known of the plants on the face towards the Perak river.

2. The materials for this Flora.

It is natural that the first local Flora for any area in the Federated Malay States should be for Taiping, as, after the opening of the States took place in 1874, no other place for a long time received similar attention from botanists.

To Taiping in 1877, Sir Hugh Low, after more than thirty-five years in Borneo, was called to be Resident: and in Taiping the enthusiasm for the study of plants which had caused him to send many beautiful Bornean species into cultivation, found expression in the organising of investigations. To him in 1877 Henry James Murton, Superintendent of the Botanic Gardens in Singapore, was sent that he might explore and report upon the available supplies of gutta-percha. Murton between October 18th and 22nd, in very bad weather, ascended the Taiping Hills and returned with collections of living plants which he despatched from the Larut river to Singapore. In a report on his tour (Straits Settlements Government Gazette for Feb. 22nd 1878) he mentions as found *Pinanga maculata* (a name for *P. disticha*, which species however, no subsequent collectors have found on the Taiping Hills), *Licuala acutifida* (which likewise has not been found there by anyone else), *Cissus porphyrophylla* (meaning *Piper porphyrophylla*), *Rhododendron javanicum*, *Rhododendron jasmiflorum*, *Nepenthes sanguinea*, *Calanthe curculigoides*, *Calanthe angustifolia*, *Anoectochilus setaceus*, *Anoectochilus Darsonianus* (*Haemaria discolor*), and several ferns. Murton then proceeded to Kuala Kangsar and to Gunong Bubu; and did not return to do any more plant-hunting over Taiping. He probably misnamed the species that others have not collected.

Low in 1881 obtained the services of Leonard Wray for the purpose of opening up experimental gardens on the Hills; and Wray in 1883 was transferred to the post of Curator of the Perak State Museum, in Taiping, where he remained until 1908, collecting plants and building up a not inconsiderable herbarium.

In 1881 Dr. (afterwards Sir) George King, then Superintendent of the Royal Botanic Gardens, Calcutta, sent a collector, Hermann Kunstler, to Taiping, where we may well believe that Low directed his search for plants. And in 1882 the missionary, Father Benedetto Scortechini, came to Taiping on a long visit—a visit which lasted until his death in 1886, and during which he made considerable collections. Mr. Ridley states that he resided in Taiping at the Residency, and therefore it would be with Sir Hugh Low.

In 1889 Sir Hugh Low retired and Sir George King withdrew his collector.

Scortechini apparently failed in the art of ticketing material, and many of his localities are with difficulty recognisable: but Kunstler ticketed his with the greatest precision.

In the year after Scortechini's death, and when the Royal Botanic Gardens, Calcutta had acquired Scortechini's collections, it was proposed that Sir George King and Sir Joseph Hooker should collaborate in producing a book on "the Flowering Plants and Ferns of Perak, Penang, Singapore, and Malacca"; but Sir Joseph Hooker withdrew, pointing out that the time was not ripe, and Sir George King determined to produce "Materials for a Flora" instead. Thus it came about that from the Herbarium of the Royal Botanic Gardens, Calcutta, emanated in a long series of valuable papers the results of the work of the men who may be called Low's botanists.

Opportunities came at intervals for the Straits botanists to visit Taiping. Mr. Charles Curtis, of the Forest Service and Superintendent of the Waterfall Gardens, Penang, was there in December 1887, September 1889, May 1890, October 1892, June 1897, October 1900, and December 1901. These visits were short, and appear to have given 214 specimens. Mr. Walter Fox in 1899, during a period of acting for him, visited Taiping and collected 55 specimens. Mr. H. N. Ridley, as Director of Gardens, Straits Settlements, found his way to Taiping in March 1891, February and March 1892, June 1893, December 1902, February 1904, and August 1909—at least there exist herbarium specimens to the number of 663, so dated. Mr. Robert Derry, while serving in the Perak State at Kuala Kangsar, collected a little about Taiping in 1899, 1900 and 1902. Mr. James Webster Anderson, Assistant Curator of the Botanic Gardens, Singapore, in 1911 took a holiday in the Taiping Hills and collected. Mr. C. Boden Kloss in May 1909 collected also. In the year 1904 Bishop G. F. Hose collected about Taiping, and the Hon'ble Mr. E. S. Hose, now Colonial Secretary, Straits Settlements, collected on Gunung Hijau in 1917. A few specimens exist collected by Mr. D. F. A. Hervey, formerly Resident Councillor, Malacca, by Mrs. Bland, wife of a Resident Councillor of Penang, by Messrs. A. B. Stevens, B. H. F. Barnard, and other Forest officers, by Mr. A. R. Venning of the Administrative Service, Sir Graeme Elphinstone, the planter, Sir Walter Napier, the lawyer and at one time the Attorney-General, the late

Mr. C. Robertson-Glasgow, and Mr. W. R. Long. In February 1917, two members of the Straits Settlements Gardens Department, Mr. Mohamed Haniff, a Field-Assistant, and Mr. Mohamed Nur, Herbarium Assistant, were sent to the Taiping Hills for living and dried plants. In February 1921 one of the authors (I. H. B.) spent a fortnight on the hills, accompanied by Mr. Haniff, and collected 520 specimens; the other author (M. R. H.) was at the time stationed in Taiping and had been there for some months, using considerable opportunities chiefly for collecting at lower levels.

All the work of the collectors named is brought into one view in the following pages; and the writings of Sir George King, Mr. J. S. Gamble, and Mr. H. N. Ridley have been fully utilised. The result is a list of 1980 species.

3. The country.

A wide belt of mangrove forest, intersected by the muddy Larut river and by many creeks, extends from the Straits of Malacca half-way to Taiping town; and for the other half of the way the land rises almost imperceptibly: so that Taiping is but 70 feet above sea level. The lowland upon the west of Taiping is outside the area of the enumeration. On the eastern edge of Taiping the hills rise almost abruptly.

Apparently at one time by the dweller in the plains the hills were collectively designated Gunong Hijau, that is to say, the Green Mountain. § But when paths began to be made into them, more accurate naming was necessary; and a clearing at 2000 feet (or 610 metres) was called the Tea Gardens from its purpose, and another between 3200 and 3700 feet, (or 975 and 1128 metres) was called Maxwell's Hill; two summits a little further off were named Birch's Hill and Caulfeild's Hill, and "Gunong Hijau" was applied to the highest and most remote summit. Birch's Hill reaches 4100 feet or 1340 metres, Caulfeild's Hill 4500 feet or 1372 metres, and Gunong Hijau 4750 feet or 1445 metres. From these three the Batu Kurau stream gets its waters, sinking into a deep hollow east of the spur whereon, facing west, is Maxwell's Hill clearing, the summit of the spur carrying a house called the Box at 1078 feet or 1240 metres. There are no greater heights over Taiping.

Murton tried by means of an aneroid barometer to ascertain the heights which he reached, and got them too high. Too high also are the heights given on some of the labels of Curtis and Ridley. These, the authors have, as far as possible, corrected in their enumeration.

The Taiping Hills are of granite. They are the central part of a short range extending from $4^{\circ} 30'$ to $5^{\circ} 45'$, with conspicuous summits north and south of Taiping higher than Gunong Hijau, known as Gunong Bintang and Gunong Bubu. Both are botanically unknown. The map opposite indicates the geographic relation-

§ Gunca, Ijok or Arenga Mountain offers an alternative origin.

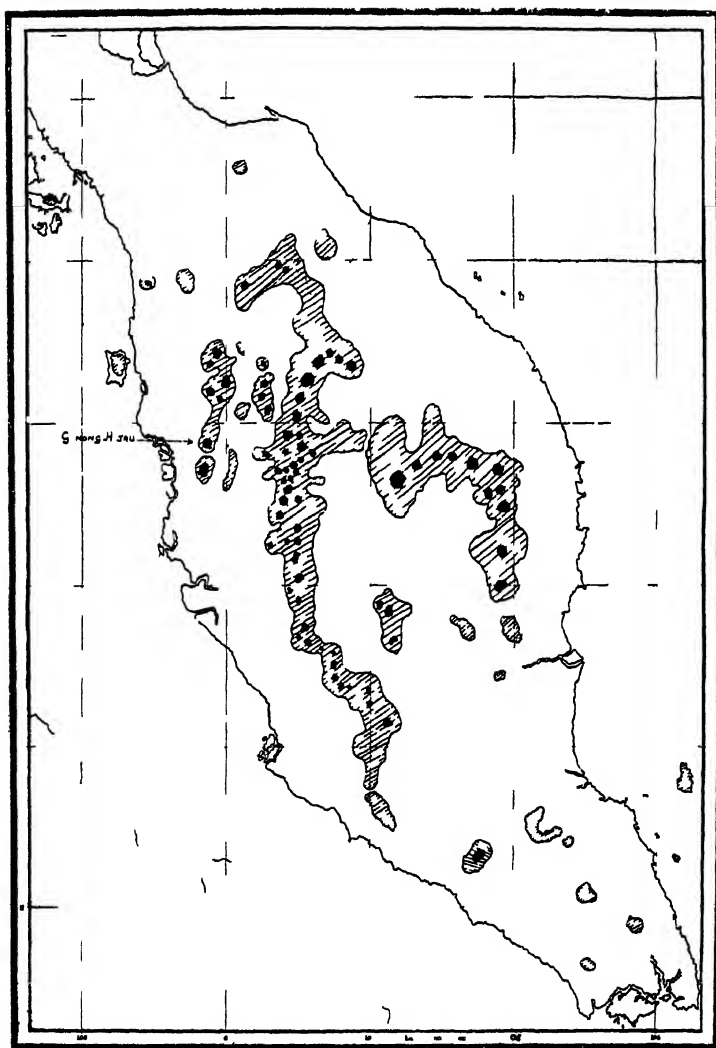


DIAGRAM NO 2 -MOUNTAINS OF THE MALAY PENINSULA OVER 2,000 FEET
AND OVER 4,000 FEET

ship of the Taiping Hills to all land exceeding 2000 feet or 610 metres and all land exceeding 1000 feet or 1220 metres. The nearest hills are (i) those of Penang, reaching 2721 feet or 837 metres, to the north-west and 50 miles away, (ii) Kedah Peak reaching 1000 feet or 1218 metres, 70 miles to the north-north-west, (iii) a lesser, much interrupted parallel range immediately east of the Perak river at no great distance, and (iv) at the distance of about 40 miles the Main range with numerous much higher summits. This part of the Main range happens to be the least known part; and most of the hills lying between the Main range and the Taiping Hills are botanically quite unknown. All are alike densely forested.

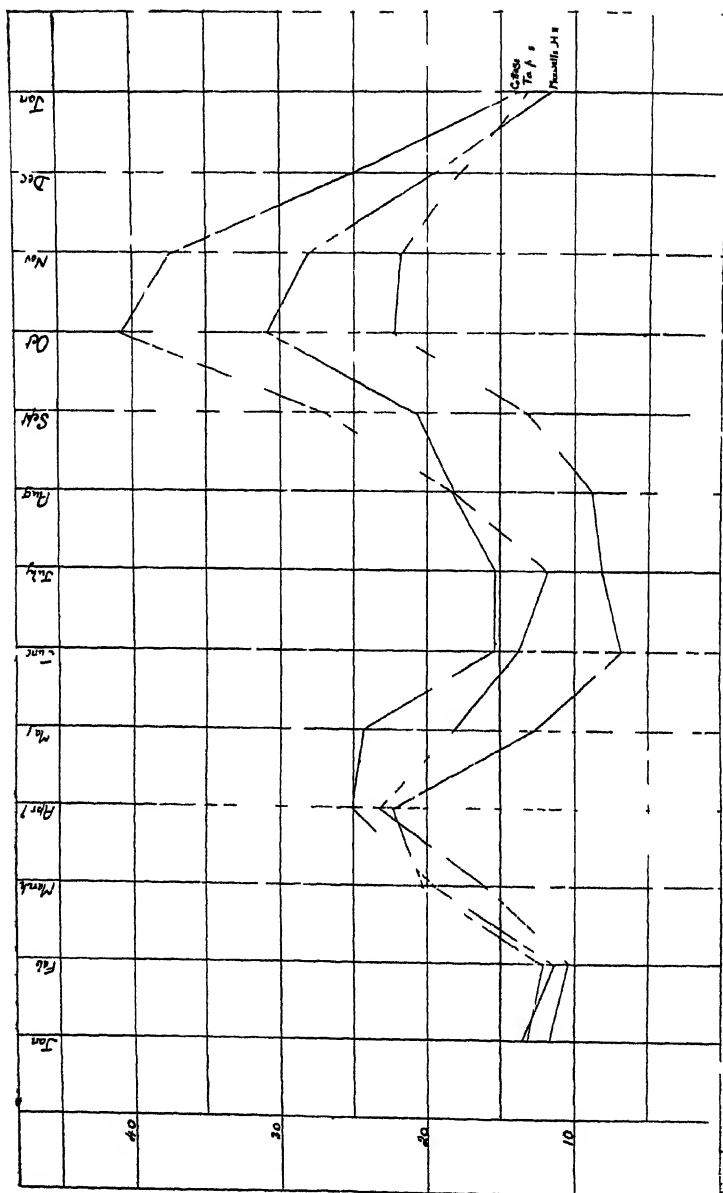
On the northern face of the summit of Gunong Hijau is a little patch of "Mossy forest," limited abruptly in a very interesting way. Elsewhere the forest changes type gradually from the tall lowland forest to the montane forest. The clearings in it are quite artificial. There are extensive continuous agricultural and mining clearings of the plain; the clearing known as the "Tea Gardens"; the considerable clearing of Maxwell's Hill, where much gardening is done and cattle are kept; clearings about a few higher houses; and the Trigonometrical Survey's clearing, for observation purposes, of the summit of Gunong Hijau. A demand for firewood is causing some enlargement of these clearings and the search for fodder for the cattle tends to the preservation of any patch of grass that can be cut.

Murton in 1877 found three clearings on the hills. There was one for cinchona, one of two acres made at Birch's orders which then was in the process of returning to secondary forest, and a small clearing made by squatters but newly abandoned. Abandoned clearings in these wet hills soon close up.

4. The Climate.

There are two periods of heavy rain in the year, occurring when the sun is overhead. At the autumnal equinox the rain is heavier than at the vernal equinox; and there is this great difference between the two periods, that during the inset of the rains of the vernal equinox, the wind being from the western side of the hills, the precipitation is similar at all elevations; but during the rains of the autumnal equinox, when the wind is blowing on the Taiping face of the hills, the higher levels receive a great deal more than the lower levels. At this time they are very wet, so wet that the sowing of peas, beet and some other temperate vegetables is useless, as they cannot be grown.

In diagram No. 4 the seasonal rainfall of Taiping town is contrasted with the seasonal rainfall of Penang (to which, from among the curves there given, it is most similar), of Kuala Lumpur, Malacca and Singapore. The rainfall of Calcutta is also given. It is clear from these curves that Taiping is a wet place. Botanists desire to know if the area constitutes a climatic island: but they



Rainfall at and over Taiping.

get very little help from meteorologists, as astonishingly meagre attention has been directed to the study of such phenomena in the Peninsula. We have examined as far as possible the phytologic evidence for such a view; and in default of meteorological facts a very non-committal attitude is necessary.

The altitude at which clouds form has not been recorded.

The dates of flowering given below suggest that February is the season of most flowers; and this indeed may well be the case. The records also suggest that towards the end of each rainy period there is a lull in flowering and that there is also a lull in July when rain is relatively light. We are not convinced that this is exactly the case; but there is certainly a lull in flowering in parts of the Malay Peninsula in June and July, such as might conceivably extend to the Taiping Hills. We make these remarks to encourage observation.

The rain about Maxwell's Hill makes it necessary in cultivation to keep a roof over plants of *Pelargonium zonale* (the Garden Geranium), *Dianthus caryophyllus* (the Carnation), and *Heliotropium peruvianum* (Garden Heliotrope); and it may be partially responsible for a dwarfing of certain introduced weeds, such as *Poa annua*, *Stellaria uliginosa*, *Calamintha gracilis*, and *Andropogon acicularis* which commence flowering at a very early stage in their growth.

5. The Vegetation.

Pages 3-6 of Sir George Maxwell's "In Malay Forests," if not written of the Taiping Hills, give the most excellent idea of their beautiful forests. The plate in Sir Frank Swettenham's "British Malaya" which is opposite p. 118, is of the forests as they lie under the Cottage.

The lower forests contain a wealth of Dipterocarpaceae, and as many of the species are among the tallest of the trees, their conspicuousness is great. They disappear upwards; but an undetermined *Shorea* reaches 3500 feet. Species of *Palauquium*, *Swintonia* and *Sloelia* are obvious with them and disappear upwards too. The lesser trees, the shrubs under them and the small woody plants exhibit the features typical of Malaysian forests. A few species of herbaceous genera, that are better developed at some altitude, appear quite low down, and are disappointing as being less showy than related species found higher; such for instance is *Camptandra parvula*, which keeps its flowers open all day, whereas the larger *Camptandra ovata* is a showy night-flowering plant: *Sonerila erecta* is the poorest of its genus, and descends low, but is not the only *Sonerila* low down; and *Didymocarpus albo-marginata* as found below 2000 feet is small-flowered.

In the upper forest, by reason of the somewhat lesser stature of the trees, which consequently admit more light to the ground—and this is especially so if the slopes are very steep—terrestrial herbs are more conspicuous. Several *Sonerilas* are found, several *Didy-*

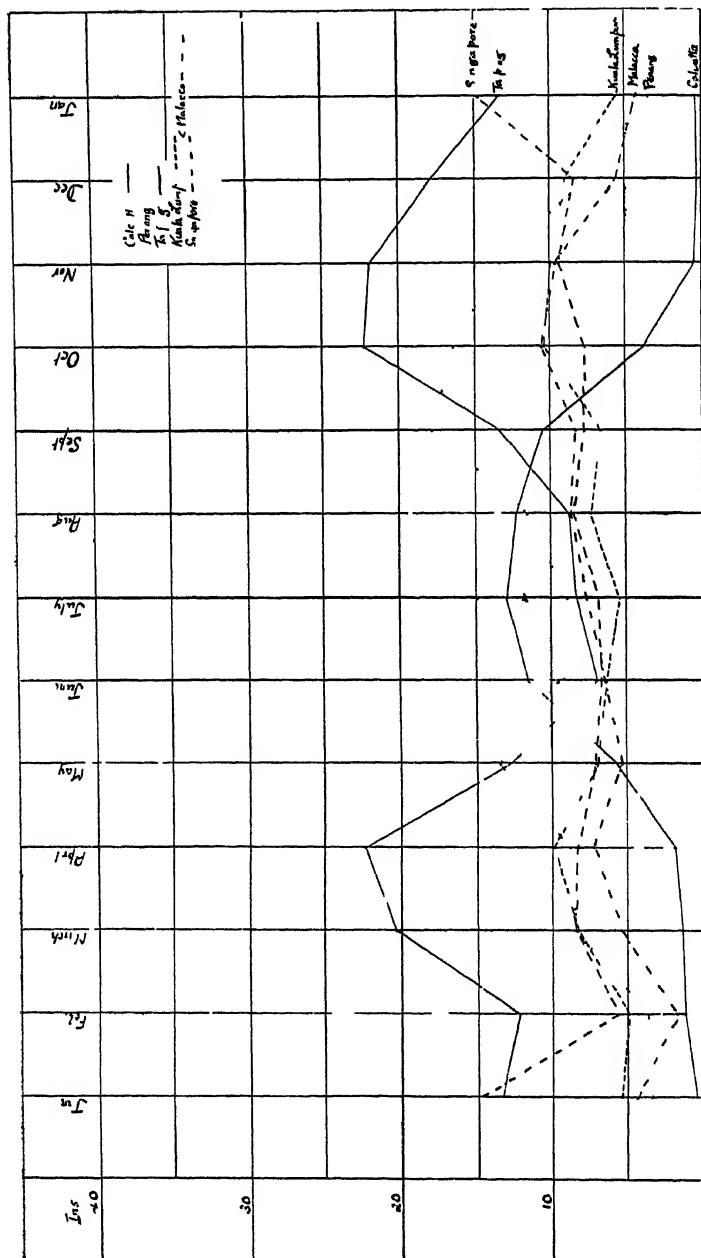


Diagram No 4

mocarps, more than one *Argostemma*, *Alocasias* and *Arisaemas*. Some of them occur as a rule as isolated individuals; others make little groups: and on the south face of Gunong Hijau where the steep hillside almost becomes a cliff, so much light gets in that there is a bank of herbs.

Another feature of the upper forests is the "tree-gardens." Species of *Vaccinium*, *Rhododendron*, *Diplycosia*, ferns, orchids, and aroids, make them. They grow and grow until they destroy themselves by their own excessive weight in falling to the soil.

Turnstroemiaceae become more evident in the upper forests and then the Saxifragaceae come to notice.

Mosses both in the lower forests and the upper forests, where they are more numerous, are not on the soil, but on projections from the soil, such as tree-roots and stones, everywhere except in the one small patch of "Mossy forest" on Gunong Hijau. There they coat the soil, the change from opportunism in taking advantage of roots and stones to dominance in coating the soil being extraordinarily abrupt.

The aspect of the "Mossy forest" is towards the north; its altitude from 4650 to 1750 feet (1417 to 1445 metres). The most abundant tree is *Eugenia caudata*, which attains there 15 feet in height. Scattered individuals of *Weinmannia Blumei* growing with it attain 25 feet, and they are the tallest of the associated trees. *Illicium cambodianum*, *Gomphandra lanceolata*, *Melastoma* sp., *Ixora concinna*, *Pavetta indica*, *Lasianthus rhinocerotis*, *Wikstroemia Candolleana*, *Phyllanthus frondosus*, *Daphniphyllum laurinum*, *Ficus variolosa*, and *Pleomele elliptica* occur.

At the edge towards the clearing of the summit of Gunong Hijau *Rhododendron malayanum*, *Diplycosia microphylla* and *Eria vestita* are present as epiphytes; and *Gleichenia* spp. climb. In the moss upon the ground are the ferns *Dryopteris gracilescens*, *Diplazium sylvaticum*, *Lindsaya scandens*, an *Oleandra*, and *Trichomanes proliferum*; and the following lowly plants:—*Argostemma involucreatum*, *Labisia polthoina*, *Loxocarpus coerulea*, *Piper penangiana*, the parasite *Balanophora multifranchiata*, a *Coelogyne*, a *Justicia*, and in great plenty *Phyllagathis hispida*, and a few palms of two species, one being a *Pinanga* and the other a *Licuala*, either *L. malayana* or *L. modesta*. Of climbers *Nepenthes sanguinea*, *Flagellaria indica*, *Dioscorea laurifolia*, *Smilax laevis*, *Rhaphidophora Korthalsii*, a *Vitis*, and a *Calamus* are present.

The low stature of the trees is undoubtedly one of the factors leading to the mossiness: but again the mossiness by creating an acid humus may determine the low stature of the trees. A more important cause for the mossiness appears to lie in the smallness of the leaves, which the overhead trees shed on the ground. It is found that *Eugenia caudata* is by no means confined to this "Mossy forest," but is quite common as a tree of the second rank under other trees, such as *Gordonia taipingensis*, *Schima Noronhai*, *Magnolia Maingayi*, *Barringtonia Scontechinii*, and *Quercus*, and that

when these trees are present no moss occurs upon the surface of the soil, but only upon projections from the soil such as roots and stones. From this it appears that the denser shade does not bring about the little-mossy condition: but that the nature of the leaf-fall produces it; for it occurs where the trees shower down upon the ground large leaves which do not decay very rapidly, but are beaten onto the surface of the soil by the heavy tropical rain and do not permit under them the growth of any thing depending for its life upon light, such as a moss protonema, but are only disturbed from their smothering effect by the stouter epicotyls of the vigorous seedlings of trees, etc., so frequently met with in these forests and backed by a considerable supply of reserve food.

The absence of large-leaved species of shading trees from the north aspect of the cone of Gunung Hijau probably in some way arises from the climatic conditions there, and should be studied. The abruptness of the change from "Mossy forest" to other forest suggests that the balance of nature has at this point got to an unstable position where a small cause can produce a big effect.

The condition of the contiguous clearing is worth study. The bracken fern, *Pteridium aquilinum*, is the commonest plant on the top, and second to it another fern, a *Nephrolepis*. With these are further ferns, e.g., *Diplazis conjugata*, *Blechnum orientale*, *Polypodium incurvatum*, *Alsophila glauca*, *Histiopteris incisa*, tied together with *Lygodium*, and run through with *Lycopodium cernuum*. Running through also are *Vitis trifolia*, *Nepenthes sanguineum*, *Isachne albens*, a *Rubus* and a *Smilax*. Standing in the tangle here and there are plants of *Unculigo latifolia*, *Dianella ensifolia*, *Gahnia javanica*, and *Imperata arundinacea*. Pushing themselves into prominence are young individuals of the woody plants *Weinmannia Blumei* and *Glochidion laevigatum*. Here and there are the herbs,—*Erechthites valerianifolia*, *Torenia atropurpurea*, *Spathoglottis aurea*, *Sporobolus indicus*; and of smaller weedy plants, *Sonerila erecta*, *Emilia sonchifolia*, *Kyllinga melanosperma*, *Scleria elata*, *Paspalum scrobiculatum*, *Paspalum conjugatum*, *Pogonatherum crinitum*, and there is a *Selaginella*, apparently *S. suberecta*.

The growth is less dense upon the side of the summit adjoining the "Mossy forest" than upon the other side of the Survey Beacon: and this is probably a consequence of the "Mossy forest" having occupied that side before the Survey cleared the hill-top.

This vegetation, which is a stage in a sere, or in less technical words, a transitional stage of returning forest, is not repeated upon the lower clearings. In them man's interference has been more continuous, and has led to the importation of a number of alien weeds. *Sagina apetala*, *Cardamine hirsuta*, *Galinsoga parviflora*, and *Poa annua* have probably arrived with European seeds: *Stellaria uliginosa* may have come from the same direction or from Japan: *Nasturtium indicum*, *Mimosa pudica*, *Blumea chinensis*, *Crepis japonica*, *Erigeron sumatrense*, *Spermacoce ocymoides*, *Solanum verbascifolium*, *Scoparium dulcis*, *Pilea muscosa*, etc. have only journeyed from the base of the hill. *Calamintha gracilis*

perhaps has come from Japan. These are all well established. *Oxalis corniculata* occurs. Commoner than any other weed at Maxwell's Hill is *Ageratum conyzoides*: and it exists in two forms. Exceedingly minute plants may be found in flower, but it reaches a quite normal size. *Impatiens Holstii*, a native of East Africa, is running wild. *Datura suaveolens* and *Tithonia diversifolia* are established. *Tritoniu crocosmaeflora* appears to be spreading.

Towards the lowest parts of Maxwell's Hill where the clearing is of the longest duration bracken occurs in small quantities; and *Colocasia esculenta* has established itself. Higher up, the banks of the terraced cultivation are either covered with a rather coarse weedy growth: or if kept cut are largely coated with *Marchantia* mixed with minute weeds, and often with a quantity of *Hydrocotyle asiatica*.

Of the species enumerated, 34% are trees, 22% are climbers, 19% are shrubs, 18% are herbs, 10% are epiphytes, and 1% are parasites.

6. An analysis of the Flora geographically.

Malaysia from Moulmein, and with the Andaman islands, to New Guinea constitutes one of the "botanic regions" of the World. The Malay Peninsula, either from the Isthmus of Kra southwards or from some point south of the isthmus, Sumatra, Java, Borneo, and all the attendant isles about them up to Wallace's line constitute a "subregion," the Western Malaysian. This subregion can be divided again into sub-sub-regions, one of which is the Malay Peninsula: and when knowledge has grown enough, the Malay Peninsula will be found divisible into botanical sub-sub-regions. We surmise that perhaps two of these meet in the Taiping area, one characterised by the features of what we may call the "Larut flora," and the other by features which mark the flora of the Central Montane area of the Peninsula; and we put forward the suggestion that these two exist, as one on which to work.

The number of species in the list is 1980: of them 41 have been introduced by man. Deducting these, the species known as natural to the Flora are 1939.

7. The endemic element, 860 species.

The geographic limit which Mr. Ridley accepted for his *Flora of the Malay Peninsula* is the 7th degree north: 819 of the species in this list, as we know them at present, do not occur outside Mr. Ridley's Malay Peninsula. But if the Isthmus of Kra, as is better, be taken for the limit northwards of the Malay Peninsula, 860 of the species in the list are endemic. §

§ Three of the species counted "endemic" to the Peninsula exist upon the Dutch Islands immediately south of Singapore. This extension beyond the political Peninsula is ignored here.

8. The local species, 196.

By local species we mean the species in the list which are not known to occur in the Peninsula anywhere except in squares *3e* and *3f*.

SIAM									
1a	2a	3a	4a	5a					
1b	2b	3b	4b	5b	6b				
									6°
	2c	3c	4c	5c	6c	7c			
	2d	3d	4d	5d	6d	7d			
									5°
	2e	3e	4e	5e	6e	7e	8e		
		3f	4f	5f	6f	7f	8f		
									4°
		3g	4g	5g	6g	7g	8g		
			4h	5h	6h	7h	8h		
3°									
			4j	5j	6j	7j	8j	9j	Oj
				5k	6k	7k	8k	9k	Ok
2°									
					7l		8l	9l	Ol
							8m	9m	Om

agram No. 5; the area for "local species," 196 in number.

Out of the 196 local species, four only are recorded at present as adding square *3f* to square *3e*, being *Synaptea perakensis*, *Synaptea Lowii*, *Aristolochia minutiflora* and *Mallotus Wrayi*—being Taiping plants which have been found in the Dindings. It seems reasonable to consider them as local; but their number is so small that it scarcely influences our discussion.

Out of the 196 species:—

7	of them occur above 4500 feet
26	between 4000 and 4500 feet
23	between 3500 and 4000 feet
39	between 3000 and 3500 feet
17	between 2500 and 3000 feet
15	between 2000 and 2500 feet
9	between 1500 and 2000 feet
16	between 1000 and 1500 feet
39	between 500 and 1000 feet
53	below 500 feet.

These figures show very clearly that the local and endemic element is by no means exclusively a montane development: but that

on the other hand it is strongest in the lowest belt. They suggest the presence of endemic species belonging to two evolutionary areas, one, the local species which have originated at low levels; the other species requiring higher elevations and for which the lowlands are unsuitable.

The following is a list of the species known only to exist below the 2000 feet contour line:—

<i>Griffithia cupularis</i>	<i>Eugenia Hoseana</i>
<i>Polvalthia dumosa</i>	<i>Eugenia Koordersiana</i>
<i>Polvalthia macrantha</i>	<i>Eugenia mollis</i>
<i>Polvalthia pachyphylla</i>	<i>Eugenia nigricans</i>
<i>Melodorum litsaeifolium</i>	<i>Eugenia Prainiana</i>
<i>Cyclea elegans</i>	<i>Eugenia Pearsoniana</i>
<i>Alsodeia cinerea</i>	<i>Eugenia quadrata</i>
<i>Garcinia dumosa</i>	<i>Eugenia setosa</i>
<i>Calophyllum subsessile</i>	<i>Eugenia tecta</i>
<i>Shorea Kunstleri</i>	<i>Barringtonia pauciflora</i>
<i>Synaptea reticulata</i>	<i>Memecylon epiphyticum</i>
<i>Stereulia Kunstleri</i>	<i>Memecylon floridum</i>
<i>Scaphium longiflorum</i>	<i>Memecylon Curtisii</i>
<i>Brownlowia macrophylla</i>	<i>Momordica Clarkeana</i>
<i>Pentace macrophylla</i>	<i>Uncaria Kunstleri</i>
<i>Pentace perakensis</i>	<i>Ardisia Wrayi</i>
<i>Pentace strychnoidea</i>	<i>Bassia Kunstleri</i>
<i>Eleocarpus Barnardii</i>	<i>Bassia longistyla</i>
<i>Santiria macrocarpa</i>	<i>Melodinus citrifolius</i>
<i>Chisocheton rubiginosa</i>	<i>Phyllanthera perakensis</i>
<i>Aglaia macrostigma</i>	<i>Genianthus rufo-velutinus</i>
<i>Lophopetalum Scortechinii</i>	<i>Erycibe magnifica</i>
<i>Salacia Wrayi</i>	<i>Erycibe strigosa</i>
<i>Colubrina anomala</i>	<i>Didymocarpus serratifolia</i>
<i>Nephelium setosum</i>	<i>Chirita Glasgovii</i>
<i>Semecarpus lucens</i>	<i>Staurogyne pauper</i>
<i>Melanochyla Kunstleri</i>	<i>Gymnostachyum magis-nervatum</i>
<i>Melanochyla densiflora</i>	<i>Phlogacanthus brevis</i>
<i>Agelaea pinnata</i>	<i>Premna sterculiifolia</i>
<i>Cordia gracilis</i>	<i>Liper Kotanum</i>
<i>Ormosia scandens</i>	<i>Bailechmiedia insignis</i>
<i>Kunstleria Kingii</i>	<i>Alseodaphne insignis</i>
<i>Caesalpinia parviflora</i>	<i>Alseodaphne paludosa</i>
<i>Parinarium Kunstleri</i>	<i>Alseodaphne Wrayi</i>
<i>Parinarium elatum</i>	<i>Litsea claviflora</i>
<i>Eugenia Dyeriana</i>	<i>Litsea oblanceolata</i>
<i>Eugenia Gageana</i>	<i>Litsea patellaris</i>

<i>Litsea pustulata</i>	<i>Ptychopyxis Kingii</i>
<i>Litsea Wrayi</i>	<i>Bulbophyllum perakense</i>
<i>Cinnamomum cinereum</i>	<i>Alpinia macrostephana</i>
<i>Cinnamomum Kunstleri</i>	<i>Costus Kunstleri</i>
<i>Henslowia Wrayi</i>	<i>Korthalsia tenuissima</i>
<i>Helicia rufescens</i>	<i>Pothos Kingii</i>
<i>Elytranthe diantha</i>	<i>Pandanus Scortechinii</i>
<i>Cleistanthus podocarpus</i>	<i>Mapania longispica</i>
<i>Coelodepas longifolium</i>	<i>Homalomena nutans</i>

The following is a list of the species known to occur above the 3000 feet contour line. (The species which occur both below the 2000 and above the 3000 feet contour lines, or occur only between them, are not listed).

<i>Gordonia taipingensis</i>	<i>Staurogyne macrantha</i>
<i>Megaphyllaea perakensis</i>	<i>Justicia Clarkeana</i>
<i>Dysoxylum interruptum</i>	<i>Premna Derryana</i>
<i>Roureopsis Scortechinii</i>	<i>Beilschmiedia Foxiana</i>
<i>Polygonum grandis</i>	<i>Machilus Scortechinii</i>
<i>Osbeckia perakensis</i>	<i>Actinodaphne montana</i>
<i>Melastoma</i> sp.	<i>Litsea monticola</i>
<i>Oxydendron floribunda</i>	<i>Daphniphyllum lancifolium</i>
<i>Campimium Wrayi</i>	<i>Ficus</i> sp.
<i>Impatiens Curtisii</i>	<i>Pasania Scortechinii</i>
<i>Gardenia virescens</i>	<i>Liparis atro-sanguinea</i>
<i>Amaracarpus caudatus</i>	<i>Liparis furcata</i>
<i>Psychotria Scortechinii</i>	<i>Liparis parvula</i>
<i>Lasianthus montanus</i>	<i>Dendrobium Foxii</i>
<i>Antistrophe Curtisii</i>	<i>Bulbophyllum ochranthum</i>
<i>Symplocos Brandiana</i>	<i>Ceratostylis puncticulata</i>
<i>Cleghornia gracilis</i>	<i>Anoetochilus ?calcaratus</i>
<i>Microchites tubulosa</i>	<i>Anoetochilus pectinatus</i>
<i>Toxocarpus Scortechinii</i>	<i>Goodyera gracilis</i>
<i>Genianthus Ridleyi</i>	<i>Geostachys decurvata</i>
<i>Dischidia</i> sp.	<i>Curculigo megacarpa</i>
<i>Gaertnera oblongeolata</i>	<i>Licuala modesta</i>
<i>Lettsonia Scortechinii</i>	<i>Calamus viridispinus</i>
<i>Didissandra quercifolia</i>	<i>Daemonorops aciculatus</i>
<i>Chirita clata</i>	

It appears possible that the hot wet country between the montane flora of the Taiping range and the sea has served as the place for the genesis of the lowland local endemic species as a peculiar element giving recognisable characteristics to the Larut Flora.

9. Penang in relation to the Taiping Flora, with 34 restricted species.

Penang and Province Wellesley more or less constitute the land in square *2d*. Common to *2d* and the squares *3e* and *3f* are 31 endemic species, unknown from elsewhere.

SIAM										
1a	2a	3a	4a	5a						7
1b	2b	3b	4b	5b	6b					6°
	2c	3c	4c	5c	6c	7c				5°
	2d	3d	4d	5d	6d	7d	8d			
	2e	3e	4e	5e	6e	7e	8e			4°
		3f	4f	5f	6f	7f	8f			
		3g	4g	5g	6g	7g	8g			3°
			4h	5h	6h	7h	8h			
3°			4j	5j	6j	7j	8j	9j	Oj	
				5k	6k	7k	8k	9k	Ok	
2°						7l	8l	9l	Ol	
							8m	9m	Om	

Diagram No. 6, of the area of the species of Penang with Taiping, 31 species.

These are their names, with a dagger against them if they are lowland species in the Taiping area, and a star if they are montane: but no mark if they are intermediate, or if they occur both below 2000 feet and above 3000 feet or if they are of unrecorded elevation.

<i>Xanthophyllum</i> Kunsteri†	<i>Uncaria</i> trinervis†
<i>Xanthophyllum</i> pulchrum†	<i>Randia</i> Curtisii†
<i>Adinandra</i> maculosa*	<i>Psychotria</i> morindaefolia
<i>Pachychlamys</i> Hemsleyanus†	<i>Bassia</i> Curtisii†
<i>Byttneria</i> Curtisii†	<i>Diospyros</i> apiculata†
<i>Glycosmis</i> macrophylla†	<i>Melodinus</i> coriaceus†
<i>Santiria</i> longifolia†	<i>Anodendron</i> pauciflorum†
<i>Melanorrhoea</i> inappendiculata	<i>Trachelospermum</i> Curtisii
<i>Melanochyla</i> nitida†	<i>Erycibe</i> praecipua
<i>Bauhinia</i> lucida†	<i>Justicia</i> Maingayi†
<i>Anisophyllaea</i> Curtisii	<i>Litsea</i> nidularis†
<i>Anisophyllaea</i> Gaudichaudiana†	<i>Rhopalocnemis</i> ruficeps
<i>Eugenia</i> Kunsteri†	<i>Cleistanthus</i> ellipticus†
<i>Memecylon</i> Wallichii†	<i>Cleistanthus</i> membranaceus†

Cleistanthus pedicellatus
Antidesma pachystachys†
Claoxylon Wallichianum

*Bulbophyllum leptosepalum**
*Globba Wallichii**
Amorphophallus minor

There are five herbs among them, one being a parasite and another an epiphyte. All the species are forest plants.

Measured by their occurrence on the Taiping hills are montane—not having been found below 3000 feet, and 22 are lowland, not having been found above 2000 feet.

10. Taiping and the mountains to the North-North-West.

The mountains north of Penang will next be discussed. The three, Kedah Peak (or Gunung Jerai), Penang and the Taiping Hills, in the present state of our knowledge, cannot be found to carry any single species which is not elsewhere; though common to two of them are a few species: for instance common to Kedah Peak and the Taiping Hills, but absent (as far as we know) elsewhere is *Talauma Kunstleri*, which descends at Taiping to 2500 feet: common to Gunung Raya in Langkawi and the Taiping Hills but absent elsewhere is *Gastrochilus albo-marginatus*: common to Penang, Gunung Raya and the Taiping Hills but absent elsewhere are *Zizyphus affinis*, *Baccaurea Kingii**, and *Arisaema Kunstleri*.* The last two are found high in the Taiping Hills.

There is no evidence in this meagre list suggesting that the area of the following diagram is a natural one as regards its high land.

SIAM

	1a	2a	3a	4a	5a				
	1b	2b	3b	4b	5b	6b			
		2c	3c	4c	5c	6c	7c		
		2d	3d	4d	5d	6d	7d	8d	
		2e	3e	4e	5e	6e	7e	8e	
			3f	4f	5f	6f	7f	8f	
			3g	4g	5g	6g	7g	8g	
				4h	5h	6h	7h	8h	
3°				4j	5j	6j	7j	8j	9j
					5k	6k	7k	8k	9k
2°									
						7l	8l	9l	Ol
							8m	9m	Om

Diagram No. 7—the area north and north-north-west of Taiping, for which no more than 5 species are recorded.

11. The relationship of the vegetation of Upper Perak to that of Taiping.

SIAM

1a	2a	3a	4a	5a				7°	
1b	2b	3b	4b	5b	6b				
	2c	3c	4c	5c	6c	7c	6°		
	2d	3d	4d	5d	6d	7d	8d		
	2e	3e	4e	5e	6e	7e	8e	5°	
		3f	4f	5f	6f	7f	8f		
		3g	4g	5g	6g	7g	8g	4°	
			4h	5h	6h	7h	8h		
3°			1j	5j	6j	7j	8j	9j	Oj
				5k	6k	7k	8k	9k	Ok
2°					7l	8l	9l		Ol
						8m	9m		Om

Diagram No. 8.—Taiping with Upper Perak, to which 11 species are confined. Upper Perak is chiefly contained in the square *4d*.

There are 11 species common the squares *3e* and *4d*—that is to say restricted to the Taiping area and the area immediately to the north-east of it. Of these *Antidesma gracillimum** and *Antidesma Kunstleri** are alike recorded for Maxwell's Hill and Gunong Inas, which is a high mountain of the Taiping range: two others, *Leea Curtisii*† and *Aerua Curtisii*† alike occur on the Waterloo Estate and at Lenggong: *Gomphandra nyssifolia**, *Didymocarpus urticaefolia** and *Piper longibractatum**—all found about the tops of the Taiping hills—were obtained by Mr. Ridley in Upper Perak on his visit to Temengoh the altitude of which is small, and *Zingiber chrysostachys** was got by Wray at 300 feet. The aroids *Homalomena trapezifolia* and *Schismatoglottis longifolia* occur on the Taiping hills both at high and at low elevations, and occur also at Temengoh. Whence in Upper Perak *Cinnamomum graciliflorum** came is uncertain. It is interesting that these few plants found high on the Taiping hills should be low down in upper Perak; but too little is the flora of square *4d* known for more to be said.

Two species are recorded as common to the three squares *2d*, *3e* and *4d*, but not wider; one is the small tree *Pajanelia multijugata*†

which is conspicuous at the very foot of the Taiping hills. The other is *Costus Kingii*,† which likewise occurs on the lower slopes.

12. The relation of the Taiping Flora to that of the Main range of the Perak-Pahang border.

The Main range of the Perak-Pahang border is contained in the four squares *4e*, *4f*, *5e*, and *5f*; but botanically *5e* and *5f* are unknown; they are included in the area of the following diagram, but they carry no effect whatsoever.

SIAM									
7°									
2a		3a		4a		5a			
2b		3b		4b		5b		6b	
6°									
2c		3c		4c		5c		6c	
2d		3d		4d		5d		6d	
								7d	
								8d	
5°									
2e		3e		4e		5e		6e	
								7e	
								8e	
		</							

If the whole of the southern half of the Main range be added so that the area contains all the squares of diagram 10, and the species be assembled together which occur in it and the Taiping area, then we find the following 25 of them to occur at low elevations.

<i>Cyathostemma</i> Wrayi	<i>Memecylon</i> fruticosum
<i>Goniiothalamus</i> Curtisii	<i>Memecylon</i> Kunstleri
<i>Roydsia</i> Scortechinii	<i>Begonia</i> taipingensis
<i>Xanthophyllum</i> bullatum	<i>Diospyros</i> subrhomboidea
<i>Alsodeia</i> Hookeriana	<i>Diospyros</i> toposiodes
<i>Alsodeia</i> pachycarpa	<i>Jasminum</i> Wrayi
<i>Ternstroemia</i> Scortechinii	<i>Heterostemma</i> piperifolium
<i>Grewia</i> erythrocarpa	<i>Hoya</i> citrina
<i>Pentace</i> Kunstleri	<i>Boea</i> paniculata
<i>Dysoxylum</i> rugulosum	<i>Monophyllaea</i> patens
<i>Aglaiia</i> Kunstleri	<i>Helicia</i> Kingiana
<i>Rhus</i> perakensis	<i>Calamus</i> longispatha
<i>Sonerila</i> nidularia	<i>Rhaphidophora</i> crassifolia

while the following 33 of them are found high only:—

<i>Aglaiia</i> cinerea	<i>Lindera</i> pipericarpa
<i>Chisocheton</i> macrothyrsus	<i>Piper</i> semangkoanum
<i>Glyptopetalum</i> quadrangulare	<i>Piper</i> magnibaccum
<i>Sonerila</i> integrifolia	<i>Loranthus</i> productus
<i>Medinilla</i> heterantha	<i>Loranthus</i> crassipetalus
<i>Medinilla</i> Scortechinii	<i>Balanophora</i> truncata
<i>Eugenia</i> corrugata	<i>Dendrobium</i> roseatum
<i>Schefflera</i> affinis	<i>Eria</i> bidens
<i>Agapetes</i> perakensis	<i>Bulbophyllum</i> oblanceolatum
<i>Fagraea</i> oblonga	<i>Thelasis</i> macrobulbon
<i>Fagraea</i> lanceolata	<i>Hornstedtia</i> grandis
<i>Dischidia</i> Scortechinii	<i>Pinanga</i> polymorpha
<i>Lettsonia</i> Curtisii	<i>Calamus</i> Curtisii
<i>Torenia</i> atropurpurea	<i>Freycinetia</i> montana
<i>Didymocarpus</i> sulphurea	<i>Habenaria</i> gigas
<i>Didymocarpus</i> parviflora	<i>Carex</i> perakensis
<i>Nothaphoebe</i> reticulata	

Intermediate between the two are *Dischidia* cordifolia, *Antistrophe* caudata, *Nothaphoebe* fruticosu, and *Musa* truncata. Extending into the two are *Cephaelis* Ridleyi, *Osmanthus* Scortechinii, *Didymocarpus* albomarginatus, *Didymocarpus* malayanus, and *Cryptocarya* Scortechinii. And of unrecorded elevation are *Debregeasia* squamata and *Ficus* obpyramidata.

If the area be widened by the inclusion of the square 4d, embracing Upper Perak, of high level plants are added *Diplospora* Wrayi,* *Didymocarpus* hispida* and *Staurogyne* arcuata,* to low

level plants (*Chirita caliginosa*,† *Ficus Lowii* and *Gastrochilus minor*, and to intermediate *Liparis comosa*, while *Diospyros rigida* has been found both high and low.

SIAM									
1a	2a	3a	4a	5a					7°
1b	2b	3b	4b	5b	6b				
	2c	3c	4c	5c	6c	7c			6°
	2d	3d	4d	5d	6d	7d	8d		
	2e	3e	4e	5e	6e	7e	8e		5°
		3f	4f	5f	6f	7f	8f		
		3g	4g	5g	6g	7g	8j	9j	4°
			4h	5h	6h	7h	8k	9k	
3°			4j	5j	6j	7j	8j	9j	Oj
				5k	6k	7k	8k	9k	Ok
2°									
						7l	8l	9l	Ol
							8m	9m	Om

Diagram No. 11. Taiping, and the whole Main range with Upper Perak added, whereby 8 further species are included.

14. The relation of the Taiping Flora to the central mountains as a whole.

Proceeding, we next enlarge the area so as to contain Gunong Tahan and the north and south approaches to it: we include the square 4d and so make the area to be as in the diagram on the next page.

Of them, the following 8 occur below 2000 feet in the Taiping hills:—

Artabotrys oxycarpus
Shorea Ridleyana
Combretum nigrescens
Vitis Scortechinii

Dissochaeta anomala
Ophiorrhiza pallidula
Baccaurea malayana
Hornstedtia triorgyale

and the following 13 occur high
Adinandra parvifolia

Gomphandra sp.

added to the number of 69, being 19 which do not pass to the south of the Main range and 49 which do so.

SIAM

1a	2a	3a	4a	5a						
1b	2b	3b	4b	5b	6b					
						6°				
		2c	3c	4c	5c	6c	7c			
		2d	3d	4d	5d	6d	7d	8d		
						5°				
		2e	3e	4e	5e	6e	7e	8e		
			3f	4f	5f	6f	7f	8f		
						4°				
			3g	4g	5g	6g	7g	8g		
				4h	5h	6h	7h	8h		
						3°				
				4j	5j	6j	7j	8j	9j	Oj
					5k	6k	7k	8k	9k	Ok
						2°				
						7l	8l	9l		Ol
								8m	9m	Om

Diagram 13. The central montane area and northwards to 1° N.

Of the 17, *Streptocaulon Wallichii*,† *Phyllanthodendron dubium*,† *Glochidion perukense*,† *Ostodes muricata*,† *Trichoglottis scaphigera*,† *Globba albiflora*† and *Curcuma Kunstleri*† are lowland;

Strobilanthes collinus,* *Strobilanthes rufo-pauper*,* *Piper penangense*,* *Bulbophyllum linearifolium*,* *Coelogyne pallens*,* *Podochilus lancifolia*,* and *Globba cernua** are montane. There is one not placeable.

of the 49 the following are lowland:—

Goniothalamus Scortechinii	Salacia Maingayi
Kadsura lanceolata	Melanorrhoea aptera
Shorea Maxwelliana	Melanorrhoea Curtisii
Pyrenaria Kunstleri	Bauhinia ferruginea
Kayea Kunstleri	Mussaenda Wrayi
Hydnocarpus nana	Bassia laurifolia
Cratoxylon Maingayi	Strychnos pencillata
Sterculia parvifolia	Strobilanthes hirtisepalus
Tarretia perakensis	Cyrtandromoea megaphylla
Evodia macrocarpa	Callicarpa angustifolia

Vitex siamica
Antidesma leucladon

Pasania Curtisii
Eria aporina

and the following montane:—

<i>Brachylome Scortechinii</i>	<i>Coelogyne carnea</i>
<i>Diospyros Scortechinii</i>	<i>Calanthe albolutea</i>
<i>Jasminum Scortechinii</i>	<i>Phreatia listrophora</i>
<i>Loxocarpus coerulea</i>	<i>Podochilus muricata</i>
<i>Strobilanthes Maingayi</i>	<i>Protolirion paradoxum</i>
<i>Engelhardtia Wallichiana</i>	<i>Scindapsus Scortechinii</i>
<i>Bulbophyllum selangorense</i>	<i>Rhaphidophora Wrayi</i>
<i>Ceratostylis cryptantha</i>	

There are nine not placed.

16. Plants confined to the mountainous centre and north-west of the Peninsula (diagram 13) and Lower Siam.

Out of the 43 species which extend into Lower Siam without passing beyond the Isthmus of Kra, 12, being *Popowia nervifolia*, *Alsodia Scortechinii*, *Schoutenia Kunstleri*, *Otophora sessilis*, *Rourea anomala*, *Brassaiopsis palmata*,* *Argostemma diversifolium*,* *Psychotria Birchiiana*, *Didymocarpus flava*,* *Pseuderanthemum cuudifolium*, *Conamomum citrinum*, and *Didymosperma Hookeriana* are restricted, upon the south of the 7th. degree North, to the area of the last diagram, the rest extending to Malacca or Singapore or the East coast. The *Brassaiopsis*, the *Argostemma* and the *Didymocarpus* are the only species found high on the Taiping hills: the others occurring low down.

17. Plants reaching Tenasserim and the Andaman islands but not extending further north.

Out of 25 species which extend into Tenasserim and the Andaman islands 11 do not pass south of the central montane region of the Peninsula and 14 do.

Adinandra villosa,* *Gomphostemma Scortechinii** and *Dendrochilum album** are montane in the Taiping hills, and do not reach the south of the Peninsula.

Adenia nicobarica,* *Ardisia andamanica*,* *Chilocarpus atroviridis** and *Staurogyne lasiobotrys** are montane and do extend into Malacca or Johore, but no one of them to Singapore.

18. Species of the Asiatic continent, chiefly Burma, which penetrate into Malaysia down the Peninsula without reaching the Malay islands.

As we have in the foregoing paragraphs 15—17 followed the range of species northwards to the limits of the Malaysian region, the species which northwards, and northwards only, transcend it may conveniently be considered next. There are 66 in the Taiping list:—

28 of them in the Peninsula pass into the central montane region, but not beyond it.

1 reaches Mount Ophir,

37 reach the lower country of Malacca, Johore and Singapore.

Out of these 66 the following are in the Taiping hills montane, *Illicium cambodianum*, *Salacia flurescens*, *Vitis Lawsoni*, *Microtropis filiformis*, *Eugenia Thumra*, *Hedyotis coronata*, *Psychotria calocarpa*, *Ardisia solanacea*, *Aeschynanthus Hildebrandtii*, *Loranthus oblectus*, *Loranthus pulcher*, *Ficus variolosa*, *Ficus chartacea*, *Elatostemma molle*, *Calanthe Fostermanni*, *Saccolabium bigibbum* and *Sphaerocaryum elegans*.

Are there southern migrants among them?—Probably, as for instance *Illicium cambodianum* and *Psychotria calocarpa* and some others. But until the plants of Tenasserim and particularly of Lower Siam are better known, a southward migration actually in progress must be obscure.

19. The relationship of Mount Ophir.

Recorded for Mount Ophir and the Taiping hills are 39 species: 17 of them occur also in Singapore island, and a further 8 in the lowlands of Johore; 7 occur in Malacca; while another is found upon the Pahang coast. None of these then, are exclusively montane in the south of the Peninsula. Among the remaining 6 are *Diplospora Kunstleri* which is recorded for the two places, and for no others, and 5, i.e. *Evodia pilulifera*, *Argostemma involu-cratum*, *Paraboea cordata*, *Liparis Maingayi*, and *Iguanura Wallichiana* which occur upon the Main range and seem to leap the lowlands to that isolated mountain. The *Liparis* and the *Paraboea* reach Kedah Peak: the *Liparis*, the *Paraboea*, the *Argostemma* and the *Eugenia* reach Penang. It is to be observed that three of these four are herbs.

20. The relationship of Malacca—which it will be remembered, is a well-worked area.

As limited to the Taiping area and square 6k, which is that of Malacca, are 12 species. Except *Iloa Maingayi* (and the "Malacca" of its label probably means Mt. Ophir), all of them are lowland plants in the Taiping area. It may be convenient to future workers if we enumerate them: they are *Sterculia bicolor*, *Pentuce eximia*, *Swintonia lurida*, *Mangifera Griffithii*, *Diospyros rufa*, *Cordyloblaste Maingayi*, *Beilschmiedia longipes*, *Baccaurea polyneura*, *Macaranga Maingayi* (Taiping elevation not recorded), *Castanopsis Ridleyi* and *Smilax Kingii*.

The total number of endemic species common to Malacca and Taiping is 230 and of them 38 are highland in the Taiping area and 130 are lowland. There are 62, either both high and low, or of unrecorded elevation.

Microchilus furcata,† which occurs low down on the Taiping hills and in the square 4g, and *Coelogyne Kingii* which occurs at unrecorded elevations in the Taiping hills and square 5j are akin to these; and *Licuala pusilla*,† which adds the Main range and Gunong Tahan is, like those, with difficulty classifiable.

21. The relationship of Singapore—another well-worked area.

As common to Taiping and Singapore Island, but not recorded from any places between or any area elsewhere are 7 species, namely, *Arlabotrys Wrayi*, *Genianthus Maingayi*, *Piper flavimarginatum*, *Beilschmeidia Kunstleri*, *Baccaurea Hookeri*, *Baccaurea latifolia* and *Freycinetia confusa*: all these as far as recorded occur at low levels in the Taiping area.

The total number of endemic species common to Singapore and Taiping is 172: and of them 14 are highland in the Taiping area and 106 are lowland. There are 52 either both high and low, or of unrecorded elevation.

22. Further endemic Taiping plants in the south of the Peninsula.

In the south of the Peninsula there are further species to the number of 51 which occur at low elevation, in Johore, for instance without occurring either in the Malacca or Singapore squares: and of them 19 are highland, and 18 lowland, and 14 either both high and low or of unrecorded elevation.

The following two lists are, (i) of the endemic species montane in Taiping which appear in the low country of the south of the Peninsula, and (ii) of the endemic species in Taiping which equally appear in this low country.

(i)

<i>Phaeanthus lucidus</i>	<i>Morinda elliptica</i>
<i>Aglaia Griffithii</i>	<i>Lasianthus ? glaberrimus</i>
<i>Eurycoma apiculata</i>	<i>Vaccinium perakensis</i>
<i>Canarium parviflorum</i>	<i>Diospyros argentea</i>
<i>Celastrus malayensis</i>	<i>Ervatamia cylindrocarpa</i>
<i>Gomphandra lanceolata</i>	<i>Urceola brachysepalala</i>
<i>Bauhinia cornifolia</i>	<i>Hoya Maingayi</i>
<i>Pyrenaria acuminata</i>	<i>Didymocarpus corchorifolia</i>
<i>Eugenia caudata</i>	<i>Justicia pubiflora</i>
<i>Barringtonia Scortechinii</i>	<i>Loranthus malaccensis</i>
<i>Phyllagathis hispida</i>	<i>Lepeostegeres Kingii</i>
<i>Sonerila bracteata</i>	<i>Breynia coronata</i>
„ <i>erecta</i>	<i>Castanopsis Wallichii</i>
<i>Schefflera Ridleyi</i>	<i>Microstylis acutangula</i>
<i>Argostemma elatostemma</i> , var.	<i>Dendrobium aegle</i>
„ <i>spinulosum</i>	<i>Bulbophyllum modestum</i>
<i>Ophiorrhiza discolor</i>	<i>Coelogyne longibractata</i>
<i>Hedyotis mollis</i>	<i>Coelogyne perakensis</i>
<i>Trophylum ferrugineum</i>	<i>Eria monticola</i>

Eria pocolata
Hornstedtia albomarginata
Zingiber gracile
Alpinia petiolata
Phrynium hirtum
Musa malaccensis

Nenga macrocarpa
Caryota obtusa
Pinanga paradoxa
Daemonorops hygrophilus
Plectocomia ? *Griffithii*
Dendrocalamus giganteus

(ii)

Polyalthia Scortechinii
Tetracera lucida, var
Artabotrys crassifolius
 " *Wrayi*
Oxymitra latifolia
 " *calycina*
Orophea enterocarpa
Xylopia magna
Melodorum lanuginosum
 " *Kingii*
 " *elegans*
Uvariella leptopoda
Drepananthus pruniferus
Limacia oblonga
Dipterocarpus Kunstleri
Balanocarpus penangianus
 " *Heimii*
Hopea globosa
Garcinia penangiana
Kayea grandis
Calophyllum canum
Hibiscus floccosus
Pentace eximia
Sterculia bicolor
Tarrietia simplicifolia
Byttneria Maingayi
Grewia Miqueliana
Eleocarpus Hullettii
Xanthophyllum stipitatum
 " *Wrayi*
Alsodeia Wrayi
Gonostylus Maingayi
Evodia malayana
Turpinia latifolia
Canarium pilosum
Canarium rufum
 " *kadondon*
Santiria laxa
 " *apiculata*
 " *fasciculata*
 " *Wrayi*
Amoora rubiginosa
 " *Ridleyi*
Aglaiia Heimii

Lophopetalum pachyphyllum
Leicaster Planchoni
Lophophyxis Maingayi
Gomphandra corymbosa
 " *penangiana*
Iodes velutina
Strombosia rotundifolia
Phytocrene palmata
 " *oblonga*
Zizyphus Kunstleri
Nephelium rubescens
Pometia alnifolia
Lepisanthes longifolia
Paranephelium macrophyllum
Smythaea macrocarpa
Swintonia lurida
 " *spicifera*
Melanorrhoea torquata
Melanochyla angustifolia
Mangifera Griffithii
Vitis cinnamomea
 " *elegans*
Leea gigantea
Ellipanthus gibbosus
Rourea rugosa
Connaropsis macrophylla
Millettia albiflora
Cordia Kurtisii
Saraca bijuga
Spatholobus Maingayi
Bauhinia Wrayi
Pithecolobium contortum
Eugenia papillosa
 " *Clarkeana*
 " *chloroleuca*
 " *penangiana*
 " *pustulata*
 " *expansa*
 " *filiformis*
 " *subdecussata*
 " *variolosa*
 " *Duthieana*
Phyllagathis Griffithii
Allomorpha exigua, var.

<i>Memecylon acuminatum</i>	<i>Beilschmiedia longipes</i>
" <i>amplexicaule</i>	" <i>Kunstleri</i>
<i>Crypteronia Griffithii</i>	<i>Nothaphoebe panduriformis</i>
<i>Casuaria Kunstleri</i> , var.	<i>Stemmatodaphne perakensis</i>
<i>Homalium propinquum</i>	<i>Cryptocarya rugulosa</i>
<i>Schefflera Hullettii</i>	<i>Litsea machilifolia</i> , var.
<i>Greenia Jackii</i>	" <i>perakensis</i>
<i>Ixora Kingstoni</i>	" <i>megacarpa</i>
<i>Mussaenda mutabilis</i>	" <i>castanea</i>
<i>Timonius Wallichianus</i>	<i>Aporosa pseudo-ficilifolia</i>
" <i>Wrayi</i>	" <i>stellifera</i>
<i>Urophyllum villosum</i>	<i>Baccaurea Maingayi</i>
<i>Aulacodiscus premnoides</i>	" <i>latifolia</i>
<i>Sideroxylon malaccense</i>	" <i>polyneura</i>
<i>Diospyros bilocularis</i>	" <i>Griffithii</i>
" <i>flavicans</i>	<i>Antidesma pendulum</i>
" <i>rufa</i>	<i>Drypetes pendula</i>
" <i>oblonga</i>	<i>Glochidion desmocarpum</i>
<i>Palaequium bancanum</i>	<i>Endospermum malaccense</i>
" <i>Clarkeanum</i>	<i>Agrostistachys sessilifolia</i>
" <i>Maingayi</i>	<i>Croton Griffithii</i>
<i>Willughbeia coriacea</i>	<i>Macaranga Lowii</i>
<i>Leuconotis Griffithii</i>	<i>Artocarpus Maingayi</i>
<i>Cordyloblaste Maingayi</i>	<i>Pasania Cantleyana</i>
<i>Chonemorpha penangensis</i>	" <i>Wallichiana</i>
<i>Ervatamia peduncularis</i>	<i>Castanopsis megacarpa</i>
<i>Erycibe malaccensis</i>	" <i>nephelioides</i>
" <i>festiva</i>	" <i>Ridleyi</i>
<i>Cyrtandra cupulata</i>	<i>Saccolabium perpusillum</i>
<i>Vitex longisepala</i>	<i>Dendrobium clavator</i>
" <i>peralata</i>	<i>Hornstedtia macrochilus</i>
" <i>coriacea</i>	<i>Elettiaopsis latiflora</i>
<i>Clerodendron myrmecophilum</i>	<i>Anomum xanthophlebium</i>
" <i>deflexum</i>	<i>Smilax Kingii</i>
<i>Thottea dependens</i>	<i>Dracaena umbratica</i>
<i>Piper Curtisii</i>	<i>Dioscorea stenomeriflora</i>
" <i>ramipilum</i>	<i>Forrestia gracilis</i>
<i>Myristica cinnamomea</i>	<i>Alocasia ovalifolia</i>
<i>Horsfieldia Lehmanniana</i>	<i>Homalomena paludosa</i>
" <i>sucosa</i>	<i>Pandanus Ridleyi</i>
<i>Knema Wrayi</i>	" <i>ornatus</i>
" <i>Kunstleri</i>	<i>Freycinetia lucens</i>
" <i>Cantleyi</i>	" <i>confusa</i>
<i>Actinodaphne pruinosa</i>	<i>Calamus densiflorus</i>
	<i>Gnetum Kingianum</i>

23. East coast plants that also are endemic.

Of the Taiping plants 3 combine the East coast of Pahang with the area of diagram 10:—*Miquelia caudata*,* *Symplocos perakensis*, and *Licuala malayana*,* one combines the East coast of Pahang with the area of diagram 10 and the West coast:—*Polyalthia Hookeriana*,* four combine the East coast of Pahang

with the area of diagram 7:—*Goniolthalmus tenuifolius*, *Eugenia arophylla*†, *Ophiorrhiza tenella** and *Randia vocarpa*; and one combines the East coast of Pahang with the area of diagram 13:—*Ryparosa Scortechini*†.

24. A summary in regard to endemic species.

In the following table the total number of endemic species of each area that has been considered are collected together. The first fact to notice is that in species common to the best-worked areas the endemism is high, reaching,

South of the Main range	..	46%
North of the Main range	..	40%
Penang	.. ..	33%
Malacca	.. ..	30%
Singapore	.. ..	20%

but the order in which these five stand is not the order in which they might be arranged by the figures on the map opposite the first page of this bulletin, in which the Main range is regarded as but 20% known. It would follow then that as the Main range becomes better known, the number of the local endemics in the Taiping area will be reduced greatly by the discovery of them in it. Thus will the noteworthy peculiarity of the area be reduced.

Number of endemic species.

Area	Taiping	reach Penang	reach Lankawi or K dah peak	enter upper Perak	reach N part of Main range	do S part	reach N. Pahang mountains	extend towards 7° N	into Lower Siam	into Tenasserim	occur in Malacca	in E. Pahang	in Johor	in Singapore
squares														
3e and 3f	196	..	..	..	..	..	..	..	..	..	..	..	..	..
diagram 6	34	34	..	..	..	..	..	..	..	..	..	..	..	..
diagram 7	5	3	5	..	..	..	..	..	..	..	..	..	..	..
diagram 8	11	..	..	11	..	..	..	..	..	..	..	..	..	..
under same	2	2	..	2	..	..	..	..	..	..	..	..	..	..
diagram 9	49	..	..	..	49	..	..	..	..	..	..	..	..	..
under same	8	8	..	..	8	..	..	..	..	..	..	..	..	..
diagram 10	69	..	..	..	37	69	..	..	..	..	..	..	..	..
diagram 11	8	..	..	8	8	8	..	..	..	..	..	..	..	..
diagram 12	24	..	..	1	17	17	24	..	..	..	..	..	..	..
diagram 13	68	43	22	6	31	52	67	68	..	..	..	..	..	..
to														
Lower Siam	43	19	15	11	25	27	16	8	43	..	22	13	20	17
to														
Tenasserim	25	13	9	7	13	18	12	2	3	25	8	4	8	6
N. to S. of														
Peninsula	329	165	43	36	162	209	65	12						
Total	871	286	94	82	350	400	184	90	46	25	263	59	184	195
Percentage	..	33	11	9	40	46	21	10	51	3	30	7	21	22

Number of Montane endemic species.

Area	Taiping	reach Penang	reach Lankawi or K-dah peak	enter upper Perak	reach N. part of Main range	do. S. part	reach N. Pahang mountains	extend towards 7° N	into Lower Siam	into Tenasserim	occur in Malacca	in E. Pahang	in Johor	in Singapore
squares														
3e and 3f	50	..	..	..	..	..	..	..	..	..	..	..	..	..
diagram 6	3	3	..	..	..	..	..	..	..	..	..	..	..	..
diagram 7	2	2	2	..	..	..	..	..	..	..	..	..	..	..
diagram 8	7	..	..	7	..	..	..	..	..	..	..	..	..	..
under same	0	0	..	0	..	..	..	..	..	..	..	..	..	..
diagram 9	18	..	..	..	18	..	..	..	..	..	..	..	..	..
under same	1	1	..	..	1	..	..	..	..	..	..	..	..	..
diagram 10	33	..	..	..	17	33	..	..	..	..	..	..	..	..
diagram 11	3	..	..	3	3	3	..	..	..	..	..	..	..	..
diagram 12	13	..	..	..	8	7	13	..	..	..	..	..	..	..
diagram 13	22	11	11	2	16	18	21	22	..	..	..	..	..	..
to														
Lower Siam	6	2	3	3	5	4	4	4	6	..	3	3	2	1
to														
Tenasserim	7	3	2	1	3	6	4	1	2	7	1	1	4	1
N. to S. of														
Peninsula	53	29	12	4	30	43	19	4	..	..	38	7	35	14
Total	218	51	30	20	101	114	61	31	8	7	42	11	41	16
Percentage	..	23	14	9	46	52	28	14	4	3	19	5	18	7
Above average by	..	3	..	6	6	7	4	..	..	..	..	..	..	..
Below average by	10	..	..	..	..	..	..	1	..	11	2	3	15	..

Conversely it is clear that there has been a development of endemism on no small scale within what is here called the central montane area of the Peninsula (diagram 12), Taiping sharing in it.

We have endeavoured to recognise this montane flora by the endemism it possesses and we have found endemic species in all the following genera, the list of which is given to call attention to the circumstance that they are genera typical of Malaysia and that it is quite unnecessary to suppose any marked wandering in of made species of these genera from more northern regions: but that to account for the development of these endemics we have but to assume evolutionary processes in the Peninsula. In which connection it may be asserted that whatever the ages of the mountains of the central montane area of the Peninsula be, they are old enough to be several times over the foster-parents of these endemics.

That the species evolved within the central montane area is to be assumed: but the question of the part the Taiping hills may have played in their origin is not yet worth discussing.

This montane flora scarcely reaches Penang, to which the lesser elevations and the greater periods of heat scarcely invite it. It is remarkable in these figures that the species of narrow distribution common to Taiping and Penang are members rather of the Larut flora.

Genera supplying the montane Taiping endemics, with the number of species in brackets of more than one

Adinandra (2)	Cleghornia	Ficus
Gordonia	Microchites	Pasania
Impatiens	Toxocarpus	Oberonia (2)
Megaphyllaea	Genianthus	Liparis (3)
Chisocheton	Dischidia (3)	Dendrobium (3)
Dysoxylon	Fagraea (2)	Bulbophyllum (5)
Aglaia	Gaertnera	Eria
Gomphandra (2)	Lettsonia (2)	Trichotosia
Glyptopetalum	Torenia	Ceratostylis
Roureopsis	Aeschynanthus	Coelogyne
Polyosma	Didissandra	Podochilus
Eugenia	Didmocarpus (6)	Thelasis
Osbeckia	Chirita	Anoectochilus (2)
Melastoma	Staurogyne (2)	Goodyera
Oxydora	Strobilanthes (3)	Habenaria
Campinia	Justicia	Gloha (2)
Sonerila (3)	Premna	Zingiber
Medinilla (3)	Gomphostemma	Hornstedtia
Schefflera (2)	Piper (5)	Geostachys
Brassaiopsis	Knema	Curculigo
Argostemma (3)	Beilschmiedia (2)	Dracaena
Mycetia	Cinnamomum (2)	Pinanga
Gardenia	Nothaphoebe	Iguanura
Diplospora	Machilus	Daemonorops
Psychotria	Actinodaphne	Calamus (2)
Lasianthus	Litsea	Pandanus (2)
Amaracarpus	Lindera	Freycinetia
Agapetes	Loranthus	Arisaema (3)
Ardisia	Balanophora	Carex
Antistrophe	Antidesma	Gnetum
Symplocos	Daphniphyllum	

Number of Lowland endemic species.

Area	Taiping	reach Penang	reach Lankawi or Kedah peak	enter upper Perak	reach N. part of Main range	do S. part	reach N. Pahang mountains	extend towards 7° N	into Lower Siam	into Tenasserim	occur in Malacca	in E. Pahang	in Johor	in Singapore
squares														
3c and 3f	91	..	..	..	..	..	..	..	..	..	..	..	..	..
diagram 6	22	22	..	..	..	..	..	..	..	..	..	..	..	..
diagram 7	1	1	1	..	..	..	..	..	..	..	..	..	..	..
diagram 8	4	..	..	4	..	..	..	..	..	..	..	..	..	..
under same	2	2	..	2	..	..	..	..	..	..	..	..	..	..
diagram 9	21	..	..	..	21	..	..	..	..	..	..	..	..	..
under same	2	2	..	..	2	..	..	..	..	..	..	..	..	..
diagram 10	25	..	..	..	14	25	..	..	..	..	..	..	..	..
diagram 11	0	..	..	0	0	0	..	..	..	..	..	..	..	..
diagram 12	8	..	..	0	4	7	8	..	..	..	..	..	..	..
diagram 13	33	23	9	3	15	22	32	33	..	..	..	..	..	..
to														
Lower Siam	23	11	9	6	11	14	7	2	23	..	9	8	9	10
to														
Tenasserim	11	7	3	2	6	6	4	..	1	11	4	2	3	3
N. to S. of														
Peninsula	178	88	25	20	83	102	22	5	..	..	132	20	71	106
Total	421	156	47	37	156	176	73	40	24	11	145	30	83	119
Percentage	..	37	11	9	37	42	17	10	6	3	34	7	20	28
Above average		4	..	..	..	..	..	..	..	..	4	..	1	6
Below average		..	..	..	3	4	4	..	1	..	..	..	..	..

It looks as if between the Taiping hills and Moulmein changes proceed evenly, as might be expected in the lowlands. For, adding to the 68 endemic species which pass as in diagram 13 northwards to 7° N. to the 34 for the Taiping with Penang endemics, 5 for the Taiping with Kedah endemics, and so on, we get:—

	Total	Lowland	Mountain
Endemics ending northwards in Tenasserim	25	11	7
„ „ „ „ Lower Siam	43	23	6
„ „ „ „ before 7° N.	107	56	27

but more work is required yet everywhere, but chiefly in Lower Siam, where hills are small and also botanically scarcely known.

25. The plants of Malaysia which are not endemic.

The next sections deal with Malaysian plants which are not confined to the Peninsula, but have overmastered sea-barriers: and first with these of narrow distribution with the Peninsula.

26. Malaysian plants, but in the Peninsula local.

In the Taiping area 32 species have been collected, which while they have been found nowhere else in the Peninsula, are known to occur in the western Malaysian islands:—

Sumatra only:—*Uvaria Larep*,† *Sabia sumatrana*,† *Eugenia Benjamina*, *Eugenia Hullettiana*,† *Eugenia subhorizontalis*,† *Piper retutinerrium*,† and *Cinnamomum lampongum*.†

Java only:—*Pudebruggea dasyphylla*,† *Piper acre*, *Litsea brachystachya*,† *Chrysoglossum villosum*, *Diglyphosa latifolia*, *Chelonistele pusilla*,* and *Physurus latifolius*.*

Sumatra and Java together:—*Stephania corymbosa*,* *Paysona dasyphylla*,* and *Strobilanthes bibracteatus*.*

Borneo only:—*Melanorrhoea macrocarpa*,* *Platyclinis sarawakensis*, *Dendrobium Derryi*, *Bulbophyllum cleistogamum*, *Arun-
dina revoluta*,† *Oclogyne quadrangularis*,* *Bromhelia brevifolia*, and *Bagnisia crocea*.

Sumatra and Borneo together:—*Saraca macroptera*, *Marsa macrothyrsa*,† and *Litsea fenestrata*.†

Java and Borneo together:—*Wightia borneensis*.*

Sumatra, Java and Borneo together:—*Henslowia Reinwardtiana*,† *Pasania Blumeana*,* and *Castanopsis costata*.

The species marked† are recorded only from low elevations; those marked* for high.

27. Malaysian plants which in the Peninsula are found in Taiping and Penang.

Another 11 which are found in the island of Western Malaysia, in the Peninsula appear confined to Taiping and Penang.

They are:—

Sumatra only:—*Saraca palembanica*† and *Trichospermum cymbiforme*.†

Java only:—*Melodorum latifolium*,† and *Platanus latifolia*.†

Borneo only:—*Magnolia Maingayi*,* *Dipterocarpus fagineus*,† *Balanocarpus Urtisii*,† *Astronia smilacifolia*.† and *Korthalsia ferox*.

Sumatra and Borneo together:—*Anplectrum pallens*.†

Java and Borneo together:—*Dalbergia phyllanthoides*† and *Litsea cylindrocarpa*.†

28. Malaysian plants which in the Peninsula occur in the central mountain area.

There are 3 species which occur in the squares 3e and 4d, namely *Leea simplicifolia*, *Aporosa arborea*, and *Rafflesia Hasseltii*; the first and second both in Sumatra and in Java: the third in Sumatra only; and no one of them clearly montane in the Taiping hills.

There are 46 occupying the area of diagram 12:—

Sumatra only:—*Ryparosa Kunstleri*, *Aglaia membranifolia*,† *Eugenia garciniaefolia*,† *Oxydendron stellulata*, *Jasminum insigne*,† *Cinnamomum rhyncophyllum*†, *Pasania Eichleri*,† *Limatodis pallidus*,* and *Eria pilifera*.*

Java only:—*Saurauia nudiflora*,* *Saurauia cauliflora*,| *Canarium denticulatum*, *Passiflora Horsfieldii*,† *Lasiacanthus gracilis*, *Litsea angulata*,* *Lindera vibracteata*,* *Platylinis gracilis*,* *Microstylis perakensis*, *Sarcopodium macropodium*,* *Dendrobium tetradon*, *Collabium nebulosum*.*

Sumatra and Java together:—*Didymocarpus reptans*, *Schefflera scandens*, *Litsea Noronhai*,† *Phaius callosus*,* *Dicerostylis lanceolata*.*

In Borneo only:—*Lucinaea Ridleyi*, *Randia impressinervia*,† *Clerodendron Ridleyi*, *Gomphostemma microcalyx*,† *Lepeoslegeres Beccarii*,* *Dendrochilum Kingii*, *Bulbophyllum catenarium*,* *Thecostele secunda*,† *Musa violascens*,† *Joinvillea malayana*,* *Pandanus stelliger*,* and *Alocasia Beccarii*.*

In Sumatra and Borneo together:—*Daphnia scandens*,* *Cryptocarya crassinervia*,† *Eria longifolia* and *Pothos Barberianus*.*

In Java and Borneo together:—*Arulia ferox*, *Lindera caesia*,* and *Liparis latifolia*.*

In Sumatra, Java and Borneo together:—*Agalmis staminea*.

29. Western Malaysian plants wide in the Peninsula.

Wider than these in the Peninsula and common to islands in Western Malaysia are:—

63 species in Sumatra only.

33 „ in Java only.

29 „ in Sumatra and Java together.

95 „ in Borneo only.

65 „ in Sumatra and Borneo together.

26 „ in Java and Borneo together.

60 „ in all three.

No useful purpose will be served by naming them. Their total is 371.

A further 12 species reach in addition Lower Siam. Two of them occur in it, the Peninsula and Sumatra, and two in Java: four of them occur in it, the Peninsula and Borneo: one is in both Sumatra and Java; two in Sumatra and Borneo together, and one in Java and Borneo together.

A count at this point shows that Borneo is known to possess 296 of these Western Malaysian plants that are in the Taiping hills, that Sumatra has 262 and Java, in spite of the much greater extent to which it has been botanised, has only 193.

30. The seas as barriers.

What means, we must ask, have the plants with which the last section deals had of crossing the seas which separate the Peninsula from the islands. There exists always the success of the random shot, e.g. the chance dispersal by a migrating bird or other means. Again it is generally believed that the bottom of the seas was bared about the south of the Peninsula at one or several times, and possibly in diverse manner in different times, so that for instance the forests of the Peninsula could stretch into Sumatra, and vice versa. From this we argue that when such a making bare of the sea-bottom has occurred, then the plants living in the south of the Peninsula at such a time or times, had greater facilities for transmigration than those in the north, and therefore the south has been likely to receive more species from other parts of the Malaysia than the north and also to give more: and evidence of this taking and giving ought to be obtainable. We find evidence in bringing the results of sections 22, 24 and 28 together in this section 30.

In sections 26-29 we have dealt with 475 plants of Malaysia which pass the seas. Of them 272 are in the Taiping area—lowland plants which reach the lowlands of the south of the Peninsula: 71 are also lowland plants in the Taiping area but do not reach (as far as we know them) the lowlands of the south of the Peninsula: 71 are montane plants in the Taiping area which descend to the lowlands in the south of the Peninsula; and 31 are montane plants in the Taiping area which do not descend. In section 24 we have summed up the total lowland plants of the Taiping area which are confined to the Peninsula as 421, and the montane plants as 218. In section 22 we have listed 178 lowland plants which reach the lowlands of the south of the Peninsula and 50 montane plants which do.

From these figures it is calculable that the chances of getting astride the seas for the lowland Taiping plants have been:—

60 per cent if they exist in the south of the Peninsula, 22 per cent if they do not;

and of the montane plants:—

55 per cent if they exist in the south of the Peninsula, 21 per cent if they do not.

The similarity of these figures is remarkable, and the support that they give to the supposition of land connections is distinct, or at any rate as distinct as is possible with such limited numbers.

In this Bulletin (Burkill and Holttum, A botanic reconnaissance on the Main Range at Fraser Hill, vol. 3 1923, p. 31) attention was directed to the way in which montane species upon the Perak-Pahang mountains descend to low levels in the south of the Peninsula and that among such as descend most of those among them as reappear in the Malay islands are found.

31. Plants of Tenasserim or the Andamans or the Nicobars extending into the Malay islands.

There are 39 species in the list which occur mostly in Tenasserim, some also in the Andamans, and a few in the Nicobars: and are found also in the islands of western Malaysia.

The most interesting of them is *Ilex glomerata**, a species of Tenasserim and Java, with Taiping as its only station in the Malay Peninsula.

*Rhynchosglossum obliquum** and *Thecostele Zollingeri* are in but Penang and Taiping: and *Liparis lucicola** is but in Langkawi and Taiping and the Dindings.

Pracris latifolia, which occurs from the Nicobars to Samoa is in the Peninsula one of the Central Montane type.

The remaining 34 reach the lowlands of the south of the Peninsula.

32. Plants of the continent of Asia, which extend into the Malay islands.

Lastly there are in the list 363 species, which are found in Burma or Siam, and also in the islands of western Malaysia, some few of them found as far northwards as the Himalaya and southern China, and some few of them found quite to the easternmost parts of Malaysia: some even wider.

In § 18 we have called attention to 66 species of the Asiatic continent north of Moulmein, found in Taiping and mostly else-

where in the Peninsula, but not in the Malay islands. It is seen that 85 per cent of the plants wide enough to live in Burma etc., and Taiping at the same time have enjoyed facilities, including pioneering constitutions, that have enabled them to get and keep, or keep at any rate, a place in the Malay islands.

The Taiping flora is at present a very interesting one to the Phytogeographer.

Abbreviations, chiefly of collectors names, used in this list.

Scort. - B. Scortechinii	Kunstl. - H. Kunstler
Curt. - C. Curtis	Ridl. - H. N. Ridley
H. & N. - Mohamed Haniff	B. & H. - I. H. Burkill and
	and Mohamed Nur Mohamed Haniff.
Hend. - M. R. Henderson	Anders. - J. W. Anderson
flr. - flower	

The names of the months are abbreviated also, and the symbol ' is used to indicate feet.

RANUNCULACEAE.

Naravelia laurifolia, Wall. At 200', Wray 2687; fr. July. A wide climber of Indo-Malaya to the Philippines; in Peninsula 5c, 2d, 4d, 6f, 5g, 6g, 8g.

DILLENIACEAE.

Delima sarmentosa, Linn. Up to 4100', Wray 1893, Ridl. 5353; fr. May, June. A climber of Indo-Malaya and China; in Peninsula common.

Tetracera assa, DC. At 100', Wray 2306; fr. and fruit July. A slender climber of Siam, Indo-China and Java; in Peninsula common.

Tetracera lucida, Wall., var. lanuginosa, Ridl. Up to 200', Kunstl. 5579; fr. Feb. A woody climber, endemic, 3f, 6k, Johore, 9m, the var. at 3e only.

Tetracera macrophylla, Wall. 100-300', Kunstl. 3388, 7564; fr. May, Sept. A climber of Sumatra; in Peninsula common.

Acrotrema costatum, Jack. At 300', Wray 1380; fr. April. A herb of Borneo; in Peninsula Langlawi to Johore except in Malacca.

Wormia oblonga, Wall. Taiping, Derry 6257; fr. Sept. A tree up to 40', of Sumatra; in Peninsula Kedah to Malacca.

Wormia pulchella, Jack. Taiping (in the Public Gardens), Curt. 1379; fr. Oct. A tree up to 40', of Sumatra and Borneo; in Peninsula 3f, 6g, 8g, 5h, 6k, 9m.

Wormia subsessilis, Miq. At Taiping, Hend. 10358; fr. Jan. A large shrub of W. Malaysia; in Peninsula common.

Dillenia indica, *Linn.* At 200', Hend. 10309; fruit Aug. A small tree of Indo-Malaya; in Peninsula 2d, 4d, 6k, 9m.

MAGNOLIACEAE.

Magnolia Maingayi, *King.* 4000-4500', Ridl., B. & H. 12962; fr. March. A shrub or tree of Borneo; in Peninsula 2d, 4f.

Manglietia glauca, *Bl.* Forest Dept. 498; fr. May. A lofty tree of Indo-Malaya; in Peninsula 2c, 2d.

Michelia montana, *Bl.* At about 4000', Wray 4038; fr. April. A small tree of Himalaya and Java; in Peninsula 2c, 4f.

Talauma Kunstleri, *King.* 2500-4000', Wray 2826, Kunstl. 6383; fr. July. A tree up to 30', endemic, 2c.

Talauma lanigera, *Hook. fil.* Larut. Kunstl., fide Ridl. A tree of about 20', endemic, 2d, 7j, 6k.

WINTERACEAE.

Illicium cambodianum, *Hance.* From 2000' upwards, all collectors; fr. Feb., March, May, fruit March. A shrub or small tree of Cambodia; in Peninsula Kedah Peak, G. Tahan, the Main Range, and Mt. Ophir.

SCHIZANDRACEAE.

Kadsura lanceolata, *King.* 500-1000', Kunstl., fide Ridl. A small climber, endemic, 2d, 4f, 5g.

Kadsura scandens, *Bl.* Wray 2313. A liane of W. Malaysia to the Philippines; in Peninsula common at low altitudes.

ANONACEAE.

Griffithia cupularis, *King.* 800-1500', Kunstl. 6643; fruit Sept. A shrub or tree, endemic and local.

Cyathostemma Hookeri, *King.* 300-800', Kunstl. 6482; fruit Aug. A liane of Bangka and Borneo; in Peninsula 2d, 9m.

Cyathostemma Wrayi, *King.* At 300', Kunstl. 4207; fr. May. A liane, endemic, 4f, 5h.

Uvaria hirsuta, *Jack.* 300-800', Kunstl. 3890, 5920; fruit Feb., April. A slender climber of Indo-Malaya; in Peninsula 2d, 3f, 4h, 5h, 6j, 6k, 0k, 9m.

Uvaria Larep, *Miq.* 300-500', Kunstl. 4011, Ridl. 11916; fr. Feb., March. A liane of Sumatra; in Peninsula 3e only.

Uvaria micrantha, *Hook. fil. and Th.* At 2000', Ridl. 2984. A liane of Indo-Malaya to the Philippines; in Peninsula 1b, 2d, 6f, 6k.

Uvariella leptopoda, *Ridl.* Up to 300', Kunstl., fide Ridl. A liane, endemic, 0m.

Cyathocalyx Maingayi, *Hook. fil.* Larut, Kunstl., fide Ridl. A tree up to 60', endemic, 2d, 6k.

Cyathocalyx virgatus, *King.* Larut, Kunstl., fide Ridl. A tree up to 60', of Java; in Peninsula 2d, 6k, 9m.

Drepananthus pruniferus, *Maing.* Larut, Kunstl., fide Ridl. A tree up to 50', endemic, 2d, 4f, 8g, 6k.

Artabotrys crassifolius, *Hook. fil.* At 500', Haniff 13202; fr. March. A liane of Burma; in Peninsula 6k, 9m.

Artabotrys gracilis, *King.* 300-1000', Kunstl. 3746, 4987; fr. Oct., fruit Jan. A slender climber of Borneo; in Peninsula 3d, 5g, 5h, 9l.

Artabotrys oxycarpus, *King.* 500-1000', Kunstl., fide Ridl. A liane, endemic, 6d.

Artabotrys suaveolens, *Bl.* At 2000', Ridl. A liane of Indo-Malaya to the Philippines; in Peninsula common.

Artabotrys venustus, *King.* 100-4000', all collectors; fr. Feb., March, Aug., Sept., fruit Jan., Sept. A liane of Siam; in Peninsula 4f, 5g.

Artabotrys Wrayi, *King.* At 300', Wray 2663, 4006; fr. July, fruit March. A liane, endemic, 9m.

Desmos chinensis, *Lour.* At Waterloo, 1800', Curt. 2705, 2717; fr. and fruit May. A tree or climber of Indo-Malaya and China; in Peninsula common.

Desmos cochinchinensis, *Lour.* 100-300', Kunstl. 4182; fr. April. A slender climber of Indo-Malaya and China; in Peninsula 2b, 4b, 6c, 2d, 5h, 6h, 6k.

Desmos dasymaschala, *Saff.* At 300', Wray, Kunstl. 4877; fr. Sept. A shrub of Burma to Java; in Peninsula common.

Desmos dumosa, *Saff.* 500-800', Kunstl. 5520; fruit Feb. A liane of Assam and Siam; in Peninsula 2d, 3f, 6k, 9m.

Desmos filipes, *Ridl.* 2500-3500', Wray 609, Kunstl. 2712, 5291, H. & N. 2500; fruit Dec.-Feb. A small tree, endemic, 6b, 6h.

Polyalthia asteriella, *Ridl.* Taiping Hill, Ridl. (not seen). A tree, endemic and local.

Polyalthia canangioides, *Boerl.* Wray 2075? A small tree of W. Malaysia; in Peninsula 6k.

Polyalthia dumosa, *King.* At 1200', Wray 2628, 2978. A shrub, endemic and local.

Polyalthia glomerata, *King.* 2800-3000', Kunstl., fide Ridl. A tree up to 50', of Lower Siam and Sumatra; in Peninsula 3e only.

Polyalthia Hookeriana, *King.* At about 2500', Ridl. 2985; fr. Feb. A tree up to 70', endemic, 4f, 4h, 5h, 7h.

***Polyalthia hypogaea*, King.** Taiping Hills, Kunsth., fide Ridl. A small tree, endemic, 4f.

***Polyalthia hypoleuca*, Hook. fil.** Up to 300', Kunsth. 5310; fruit Dec. A tree of Borneo; in Peninsula 2d, 4h, 6j, 6k, 9m.

***Polyalthia laterifolia*, King.** Larut, Kunsth., fide Ridl. A tree up to 70', of Java; in Peninsula 4f, 9m.

***Polyalthia macrantha*, King.** Larut, Kunsth., fide Ridl. A tree up to 70', endemic and local.

***Polyalthia macropoda*, King.** Wray 2075? A tree up to 60', endemic, 2d, 4e, 4f, 8l, 9m.

***Polyalthia oblonga*, King.** 2500-3000', Wray 2805, Curt. 1281. 2703; fr. May, Dec. A small tree of Borneo; in Peninsula 2d, 9k, 9l.

***Polyalthia pachyphylla*, King.** 300-500', Kunsth. 7516; fruit April. A tree up to 100', endemic and local.

***Polyalthia Scortechinii*, King.** Larut, Kunsth., fide Ridl. A small tree, endemic, 1b, 4f, 6g, 5h, 5k, 9l, 9m.

***Polyalthia sumatrana*, King.** Larut, Kunsth., fide Ridl. A tree up to 60', of Sumatra and Borneo; in Peninsula 4f, 6g, 5h, 9m.

***Anaxagorea Scortechinii*, King.** At Waterloo, Curt.; fruit May. A bush or small tree of Lower Siam; in Peninsula common.

***Goniothalamus Curtisii*, King.** At Waterloo, Curt. 2706; fr. May. A shrub or small tree, endemic, 5g, 5h.

***Goniothalamus macrophyllus*, Hook. fil.** Up to 3000', Wray 2987, Curt. 2706, Ridl. 5377, H. & N. 2351; fr. Feb., May, June. A shrub or small tree of W. Malaysia; in Peninsula common.

***Goniothalamus Ridleyi*, King.** At Batu Kurau, Curt. 2893; fr. Oct. A tree up to about 20', of Borneo; in Peninsula 4d, 3f, 4f, 8g, 6k, 9m.

***Goniothalamus Scortechinii*, King.** Taiping, Kunsth., fide Ridl. A shrub or small tree, endemic, 2d, 4d, 4e, 5f, 5h.

***Goniothalamus tapis*, Miq.** Larut, Kunsth., fide Ridl. A shrub or small tree of Sumatra and Borneo; in Peninsula 2d, 6k, 7k, 9m.

***Goniothalamus tenuifolius*, King.** 2000-3000', Ridl. (not seen). A bush or small tree, endemic, 2c, 4d, 3f, 4f, 8g, 5h.

***Orophea dodecandra*, Miq.** 300-500'. Kunsth. 7386; fr. March. A tree up to 50', of Borneo; in Peninsula common.

***Orophea enterocarpa*, Masing.** 300-800', Kunsth. 7642, 7695; fr. April, fruit June. A tree up to 30', endemic, 6g, 7j, 6k.

***Orophea hastata*, King.** Larut, Kunsth., fide Ridl. A small tree, endemic, 4d, 3f, 5g, 9m.

Mitrephora macrophylla, *Oliv.* 500-2500', Wray 2942, Curt. 1279, Ridl. 2985, 5377; fr. Feb., June, Dec. A small tree, endemic, 2d, 4d, 6e, 3f, 4f, 4g, 5h.

Mitrephora Maingayi, *Hook. fil.* 300-1000', Kunstl. 5242, 7547, 7743; fr. June, Dec., fruit April. A tree up to 50', of Siam, Indo-China, and Borneo; in Peninsula 2d, 4d, 5h, 6k.

Mitrephora reticulata, *Hook. fil.* At about 4000', Wray, Anders. 128, B. & H. 13023; fr. and fruit March. A tree up to 30', of Indo-Malaya; in Peninsula common.

Popowia nervifolia, *Maing.* Taiping Hills, fide Ridl. A small tree of Lower Siam; in Peninsula 2d, 4d, 4f, 6f, 5h.

Popowia perakensis, *King.* 2000-4000', Wray 2055, 2825, 3233, Curt. 1990; fr. Sept., fruit June. A small tree, endemic and local.

Popowia ramosissima, *Hook. fil. & Th.* 800-2000', Kunstl. 7743, Curt. 1994, Anders. 98, H. & N. 2390; fr. June, Sept., fruit Feb. A small tree of W. Malaysia to Philippines; in Peninsula common.

Oxymitra affinis, *Hook. fil. & Th.* 500-800', Kunstl. 5126; fruit Nov. A climber of Lower Siam; in Peninsula 6k, 7l, 9m.

Oxymitra biglandulosa, *Scheff.* Wray 2082; fruit June. A climber of W. Malaysia; in Peninsula 4f, 5h, 6k, 9m.

Oxymitra calycina, *King.* 500-800', Kunstl. 6780; fr. Oct. A climber, endemic, 1b, 2b, 2d, 4e, 9m.

Oxymitra latifolia, *Hook. fil. & Th.* 800-1000', Kunstl. 6879; fruit Nov. A climber, endemic and common.

Melodorum elegans, *Hook. fil. & Th.* 300-500', Wray 1823, Kunstl. 3324; fr. April, Sept., fruit April. A slender climber, endemic, 2d, 5h, 6k, 9l, 9m.

Melodorum fulgens, *Hook. fil.* 100-4000', Wray 2441, H. & N. 2317; fr. Feb., fruit July. A climber of Borneo; in Peninsula 4f, 6g, 5h, 6k, 9m.

Melodorum Kingii, *Boerl.* 300-500', Wray 1965, Kunstl. 5344; fr. Dec., fruit May. A liane, endemic, 5h, 6k.

Melodorum lanuginosum, *Hook. fil. & Th.* 300-500', Wray 2568, Kunstl. 5312; fr. Dec., fruit July. A liane, endemic, 1b, 2d, 3f, 6j, 6k, 9m.

Melodorum latifolium, *Hook. fil. & Th.* 500-2500', Wray 3224, Kunstl. 6293. A liane of W. Malaysia; in Peninsula 2d, 4f.

Melodorum litsaefolium, *King.* 300-800', Kunstl. 4986; fr. Oct. A liane, endemic and local.

Melodorum manubriatum, *Hook. fil. & Th.* Wray 2085, 2640; fr. June, fruit June, Aug. A liane of Tenasserim, Bangka and Borneo; in Peninsula common.

Melodorum pisocarpum, *Hook. fil. & Th.* At 200', Wray 2149; fruit June. A climber of Sumatra; in Peninsula 2d, 5j, 6k, 9m.

Melodorum prismaticum, *Hook. fil. & Th.* 100-500', Wray 2068, 2447, Kunstl. 3922; flr. July, fruit Feb., June. A liane of Bangka and Borneo; in Peninsula 2d, 4f, 6k, 9m.

Melodorum rubiginosum, *Hook. fil. & Th.* Near Batu Kurau, Curt.; flr. Oct. A liane of Indo-Malaya; in Peninsula 2d, 4f.

Xylopia fusca, *Maing.* At 300', Kunstl. 2816; fruit Feb. A tree up to 80', of Borneo; in Peninsula 2d, 6k.

Xylopia magna, *Maing.* 500-800', Kunstl. 3712; fruit Jan. A tree up to 60', endemic, 4f, 6k.

Xylopia olivacea, *King.* 2500-4000', Wray 2054, 2818, Curt. 1992, Ridl. 11925; flr. Feb., June, Sept., fruit Aug. A tree up to 70', endemic, 4g, 6j.

Phaeanthus lucidus, *Oliv.* At 4076', Forest Dept. 1451; flr. and fruit Feb. A bush or small tree, endemic, 2d, 7g, 5h, 7j, 6k, 7l, 9m.

Phaeanthus nutans, *Hook. fil. & Th.* 300-500', Wray 4182, Kunstl. 8435; fruit Jan., June. A shrub or small tree of Sumatra; in Peninsula common.

MENISPERMACEAE.

Tinomiscium petiolare, *Miers.* 1000-1500', Kunstl. 8494; flr. Feb. A climber of Indo-Malaya; in Peninsula common.

Fibraurea chloroleuca, *Miers.* 300-800', Wray 2166, Kunstl. 6451; flr. Aug., fruit June. A liane of W. Malaysia; in Peninsula common.

Arcangelisia Loureiri, *Diels.* 200-800', Wray 2147, 3153, Kunstl. 5608; fruit Feb., June. A liane of Indo-China and Lower Siam; in Peninsula 6k.

Limacia oblonga, *Miers.* At 300', B. & H. 13037. A climber, endemic and common.

Pericampylus incanus, *Miers.* 300-4000', Wray 2539, Ridl.; flr. July. A climber of Indo-Malaya and China; in Peninsula common.

Stephania capitata, *Spreng.* Up to about 3000', Curt. 1995, Ridl.; flr. Aug., Sept. A climber of W. Malaysia; in Peninsula 2d, 8g, 5h, 7k, 9l, 9m.

Stephania corymbosa, *Walp.* 3000-3800', B. & H. 12832; fruit March. A climber of W. Malaysia; in Peninsula 3e only.

Stephania hernandifolia, *Walp.* At 100', Wray 2438; fruit July. A climber of Africa and Indo-Australia, in Peninsula doubtfully from Penang.

Cyclea elegans, *King.* 1500-2000', Kunstl., fide Ridl. A climber, endemic and local.

Cyclea laxiflora, *Miers.* Taiping Hills, Kunstl., fide Ridl. A slender climber of Lower Siam; in Peninsula Taiping to Singapore.

CRUCIFERAE.

Nasturtium indicum, *DC.* At 3400', B. & H. 12813; fr. March. A weed of S. E. Asia; in Peninsula 2d, 8g, 9m.

Cardamine hirsuta, *Linn.* At 3400', B. & H. 12816. An introduced weed of temperate and subtemperate regions; in Peninsula 2d, 9m.

CAPPARIDACEAE.

Roydsia Scortechinii, *King.* 300-800', *Kunstl.*, fide *Ridl.* A climber, endemic, 5h.

Capparis larutensis, *King.* At 500', *Kunstl.* 5103; fr. Nov. A thorny climber, endemic, 4f.

VIOLACEAE.

Alsodeia cinerea, *King.* Up to 300', *Kunstl.* 3416; fruit Sept. A shrub, endemic and local.

Alsodeia comosa, *King.* At Taiping, *Ridl.* 14676; fruit Aug. A shrub or small tree of Indo-China and Borneo; in Peninsula 4f, 8g, 5h.

Alsodeia floribunda, *King.* Larut Hills, *Kunstl.*, fide *Ridl.* A shrub or tree of Sumatra; in Peninsula 4e, 4f, 6k, 9m.

Alsodeia Hookeriana, *King.* 300-500', *Kunstl.* 3362; fruit Sept. A tree up to 30', endemic, 5g.

Alsodeia pachycarpa, *King.* At Waterloo, 500', *Curt.* 2718; fruit May. A small tree, endemic, 5g.

Alsodeia Scortechinii, *King.* At 100', *Wray* 2339; fruit June. A shrub or tree of Lower Siam; in Peninsula 5h.

Alsodeia Wrayi, *King.* 500-800', *Kunstl.* 3199; fr. Aug. A small tree, endemic, 2d, 4d, 4f, 9k.

POLYGALACEAE.

Polygala venenosa, *Juss.* From 500' upwards, all collectors; fr. Feb., March, Aug., Sept., fruit Oct. A small shrub of W. Malaysia to the Philippines; in Peninsula common.

Salomonina cantoniensis, *Lour.* At Taiping, *Hend.*; fr. all the year. A small herb of S. E. Asia; in Peninsula common.

Epirizanthus elongata, *Bl.* At 2500', *Ridl.* A small parasitic herb of Tenasserim to Borneo, and China; in Peninsula common.

Trigonistrium hypoleucum, *Miq.* 500-1000', *Kunstl.* 3784; fruit Jan. A tree of Sumatra; in Peninsula 2d, 4i, 5h, 6j, 9m, 0m.

Xanthophyllum affine, *Korth.* 2500-3500', *Wray* 2803, 2815, 2947, H. & N. 2358, 2478; fr. and fruit Feb. A bush or tree of Tenasserim to the Philippines; in Peninsula common.

Xanthophyllum bullatum, *King*. At 100', Kunsth. 3161; fr. and fruit Aug. A shrub or small tree, endemic, 5h.

Xanthophyllum Griffithii, *Benn*. At 1500', H. & N. 2392; fr. Feb. A tree up to 60', of Tenasserim; in Peninsula 2d, 4c, 4f, 5h, 6j, 6k.

Xanthophyllum Kunstleri, *King*. 300-800', Kunsth. 3512; fr. Oct. A tree up to 80', endemic, 2d.

Xanthophyllum Palembangicum, *Miq*. 500-3400', Kunsth. 7615, H. & N. 2392, B. & H. 12822; fruit March, May. A small tree of Sumatra; in Peninsula common.

Xanthophyllum pulchrum, *King*. At 300', Wray 2659. A shrub or small tree, endemic, 2d.

Xanthophyllum stipitatum, *Benn*. 500-1000', Kunsth. 3285, fruit Jan. A tree up to 70', endemic, 4g, 6g, 6k.

Xanthophyllum Wrayi, *King*. At about 300', Kunsth. 2770, Ridl., Burn-Murdoch 166; fr. Feb. A shrub, endemic and common.

CARYOPHYLLACEAE.

Stellaria uliginosa, *Murr*. 3400-4000', B. & H. 12652, 12813; fr. Feb. and March. A small herb of North temperate regions. Doubtless introduced. A plant collected by Ridley at 4000' in 1892 may be this. Not recorded from elsewhere in the Peninsula.

Sagina apetala, *Linn*. At 3700', B. & H. 12612; fr. March. A small herb of Europe; not previously recorded from the Peninsula. Doubtless introduced.

HYPERICACEAE.

Cratoxylon Maingayi, *Dyer*. Public Gardens, Taiping, Burkill; fr. March. A tree up to 40' endemic, 2d, 6g.

FLACOURTIACEAE.

Flacourtia Rukam, *Zoll. and Mor*. 100-4300', Wray 2399, Kunsth. 2858, B. & H. 12578; fr. March, July, fruit March. A small thorny tree of Indo-Malaysia; in Peninsula common.

Hydnocarpus castanea, *Hook. fil*. 1000-1500', Kunsth. 6872. A tree up to 60', of Burma and Tenasserim; in Peninsula 1b, 2d, 6e, 3f, 4f, 5g, 5h.

Hydnocarpus nana, *King*. Up to 2000', Wray 2060, Ridl. 3002. A small tree, endemic, 2d, 4d, 4f, 5h.

Hydnocarpus Wrayi, *King*. Larut, Kunsth., fide Ridl. A tree up to 25', endemic and local.

Ryparosa Kunstleri, *King*. At 2500', H. & N. 2379; fruit Feb. A tree up to 100', of Sumatra; in Peninsula 3f, 4f, 5h.

Ryparosa Scortechinii, *King*. 300-500', Kunstl. 3151; fruit Jan. A small tree, endemic, 6e, 2d, 4f, 7g, 5h.

GUTTIFERAE.

Garcinia atroviridis, *Griff.* At 2000', Ridl. A tree up to 60', endemic, common; occasionally cultivated.

Garcinia costata, *Hemsl.* At 300', Wray 525. A tree up to 70', endemic and local.

Garcinia dumosa, *King*. 100-200', Wray, fide Ridl. A shrub, endemic and local.

Garcinia eugeniaefolia, *Wall.* At 2500', H. & N. 2375; fruit Feb. A tree up to 60', of Tenasserim; in Peninsula common.

Garcinia Gaudichaudii, *Lunch. and Triana.* Taiping Hills, fide Ridl. A small tree of Indo-China; in Peninsula 2d, 4f, 5j.

Garcinia Mangostara, *Linn.* The Mango-teen. Cultivated all over the Peninsula. Not known in a wild state.

Garcinia nervosa, *Miq.* 300-600', Kunstl. 3197. A tree up to 80', of Sumatra and the Philippines; in Peninsula 5h, 6k, 0k, 9m.

Garcinia nigrolineata, *Punch.* At 300', Wray 2150; fr. June. A tree up to 40', of Burma to the Carimon Is.; in Peninsula common.

Garcinia opaca, *King.* At 100', Kunstl. 5460; fruit Jan. A tree up to 40', endemic, 4f. A doubtful species.

Garcinia penangiana, *Pierre.* At 100', Kunstl. 7565; fr. May. A tree up to 40', endemic, 2d, 3f, 6f, 9j, 9m.

Calophyllum canum, *Hook. fil.* At 100', Kunstl. 5420; fr. Jan. A tree up to 80', endemic and common.

Calophyllum Kunstleri, *King.* At 100', Kunstl. 5734; fruit Dec. A tree of Borneo and the Philippines; in Peninsula 1b, 2d, 6e, 8g, 5h, 6j.

Calophyllum molle, *King.* 1000-1500', Kunstl. 6274, Forest Dept. 20; fr. Feb., fruit Oct. A tree up to 80', of Sumatra; in Peninsula 2d, 4f, 6g.

Calophyllum pulcherrimum, *Wall.* At Taiping, Anders. 114, Burn-Murdoch 330; fruit March, May. A tree up to 80', of Indo-China and W. Malaysia; in Peninsula common.

Calophyllum subsessile, *King.* Taiping, Kunstl., fide Ridl. A tree up to 80', endemic and local.

Kayea grandis, *King.* 300-1000', Kunstl. 7294, 7500; fr. April. A tree up to 80', endemic, 2d, 3f, 6j, 6k.

Kayea Kunstleri, *King.* 300-500', Kunstl. 6850; fr. Nov. A tree up to 50', endemic, 2d, 3f, 5h.

Kayea nervosa, *T. Anders.* At 100', Kunstl. 5569; fr. Feb. A tree up to 40', of Burma; in Peninsula 3c only.

Mesua ferrea, *Linn.* At Taiping, Venning; fr. Oct. A tree of Indo-Malaya; in Peninsula common.

TERNSTROEMACEAE.

Adinandra acuminata, *Korth.* 2500-4000', Wray 618, 2804, Kunstl. 6289, 6359, Anders. 103, H. & N. 2339, B. & H. 12830, 13280; fr. Feb., March, fruit July. A tree up to 60', of Sumatra; in Peninsula common.

Adinandra dumosa, *Jack.* 100-300', Wray 1972, Hend. 10137; fr. Feb. A bush or small tree of W. Malaysia; in Peninsula very common.

Adinandra integerrima, *T. Anders.* At Waterloo, Curt. 2723; fr. May. A small tree of Siam and Indo-China; in Peninsula 1a, 1b, 2d, 5g, 6g.

Adinandra macrantha, *Tey. and Binn.* Taiping Hills, Kunstl., fide Ridl. A tree up to 80', of Sumatra and Java; in Peninsula 8g, 5h, 7h, 9l.

Adinandra maculosa, *T. Anders.* At 2500', Wray 2817. A tree up to 60', endemic, 2d.

Adinandra parvifolia, *Ridl.* At 4000', Ridl. 5236; fr. June. A tree up to 40', endemic, 4e, 6e.

Adinandra villosa, *Choisy.* At 4000', Forest Dept. 5753; fruit Jan. A tree up to 50', of Tavoy; in Peninsula 2d, 6e, 4f, 5g.

Ternstroemia Scortechinii, *King.* 300-500', Kunstl. 3756; fruit Jan. A small tree, endemic, 4f, 5g, 6g.

Eurya acuminata, *DC.* 2000-4200', Curt. 1999, B. & H. 12619; fr. Sept., fruit March. A shrub or small tree of Indo-Malaysia and China; in Peninsula common.

Pyrenaria acuminata, *Planch.* At 4300', B. & H. 12870; fr. Feb. A small tree, endemic and common.

Pyrenaria Kunstleri, *King.* 300-2000', Kunstl. 3948, Curt. 2713, Ridl.; fr. March, fruit Feb., May. A tree up to 40', endemic, 2d, 4f, 5h.

Schima Noronhae, *Reinw.* 2000-2500', Hend. 10126, B. & H.; fr. Jan., March. A tree up to 50', of Indo-Malaya; in Peninsula 1b, 2d, 6e, 4f, 5g, 5h.

Gordonia taipingensis, *Burkill.* 3500-4300', H. & N. 2359, B. & H. 12734; fr. Feb., March. A tree up to 50', endemic and local.

Actinidia Championii, *Benth.* 3000-4000', Kunstl. 5437, Ridl. 5232, B. & H. 12729; fr. June, fruit Jan., March. A climber of China and Sumatra; in Peninsula 5h, 7k.

Saurauia cauliflora, *Bl.* At Batu Kurau, Scott., fide Ridl. At Waterloo, Curt. 2720; fr. May. A tree of Java; in Peninsula 5h.

Saurauia nudiflora, *DC.* 2000-4400', Fox 166, Ridl., B. & H. 12967; fr. March, Oct., Dec. A bush or small tree of Java; in Peninsula 1d, 6e, 5g, 5h, 6j.

Saurauia tristyla, *DC.* 100-4000', Scott. 1535, Curt. 1285, Ridl., Hend. 10048, 10144, 10424; fr. Jan., Feb., Oct. A small tree of Indo-China and Siam; in Peninsula common.

Archytea VahlII, *Choisy*. At Taiping, Wray 2564, Haniff 13115; fr. March, July. A small tree of W. Malaysia; in Peninsula 2d, 4c, 8g, 5h, 9j, 6k, 8l, 9m.

DIPTEROCARPACEAE.

Dipterocarpus fagineus, *Vesque*. 500-2000', Kunsth. 3527, Ridl. A tree up to 80', of Borneo; in Peninsula 2d, 4f.

Dipterocarpus grandiflorus, *Blanco*. 400-2000', Wray 4057, Ridl.; fruit May. A tree up to 150', of Sumatra, Borneo and the Philippines; in Peninsula common.

Dipterocarpus Kunstleri, *King*. 500-800', Kunsth. 7606; fruit May. A tree up to 120', endemic, 6g, 5h, 6j, 6k.

Anisoptera Curtisii, *Dyer*. 300-2000', Kunsth. 3618, 3706, B. & H.; fruit Nov., Dec. A tree up to 100', of Lower Siam, Borneo and the Philippines; in Peninsula 2d, 3f, 6j.

Shorea Kunstleri, *King*. 500-800', Kunsth. 3705; fruit Dec. A tree up to 100', endemic and local.

Shorea macroptera, *Dyer*. 500-1000', Kunsth. 3742; fruit Jan. A tree up to 80', of Borneo; in Peninsula common, unless absent in the N. E.

Shorea Maxwelliana, *King*. 300-800', Kunsth. 3744; fruit Jan. A tree up to 80', endemic, 2d, 5h, 6j.

Shorea Ridleyana, *King*. 500-800', Kunsth. 3571, 3617; fr. Nov. A tree up to 80', endemic, 6f, 5g.

Pachychlamys Hemsleyanus, *Ridl.* At Taiping, Curt. 3213; fruit Oct. A tree up to 60', endemic, 2d.

Pachychlamys Thiseltoni, *Ridl.* Taiping Hills, Kunsth., fide Ridl. A tree up to 80', of Sumatra; in Peninsula 2d, 3f, 4f, 5h, 8j, 9k.

Hopea globosa, *Brund.* At 700', B. & H. 13035; a seedling in March. A lofty tree, endemic, 6f, 7g, 5h, 5j, 8j, 7k.

Hopea micrantha, *Hook. fil.* 500-800', Kunsth. 3525; fr. Oct. A tree up to 80', of Borneo; in Peninsula 2d, 3f, 6k, 0m.

Hopea nervosa, *King*. 500-800', Kunsth. 3690; fruit Dec. A tree up to 70', endemic, 4e.

Hopea Pierrei, *Hance*. Taiping Hills, Kunstl., fide Ridl. A tree up to 80' or more, of Indo-China, Borneo and the Philippines; in Peninsula 2d, 6k, 9m.

Synaptea faginea, *Pierre*. Larut, Kunstl., fide Ridl. A tree up to 70', of Indo-China and Tenasserim; in Peninsula 2d, 3f, 5h.

Synaptea Lowii, *Ridl*. 800-1200', Kunstl. 7496; fr. April. A tree up to 80', endemic, 3f.

Synaptea perakensis, *Ridl*. 300-1500', Wray 2264, Kunstl. 7549; fr. April, fruit June. A tree up to 80', endemic, 3f.

Synaptea reticulata, *Ridl*. 1500-2000', Kunstl. 6969; fr. Dec. A tree up to 80', endemic and local.

Vatica Kunstleri, *Ridl*. At 300', Kunstl. 5338; fruit Dec. A shrub or tree up to 30', endemic, 4f.

Vatica Wallichii, *Dyer*. At 100', Kunstl. 5432, 76594; fr. Sept., fruit Jan. A tree up to 100', of Lower Siam and Bangka; in Peninsula 2d, 4f, 4g, 8g, 4h, 8j, 6k, 9k, 9l, 9m.

Balanocarpus Curtisii, *King*. 100-500', Kunstl. 3294, 6543; fr. Aug., Sept. A tree up to 30', of Borneo; in Peninsula 2d.

Balanocarpus Hiemii, *King*. Forest Dept. 28; fr. Sept., fruit Feb. A tree up to 60' or more, endemic, 2d, 5g, 6g, 8g, 4h, 5h, 6j, 6k.

Balanocarpus penangianus, *King*. At Taiping, Kunstl., fide Ridl. A tree up to 70', endemic, 2d, 6k.

Pachynocarpus Stapfianus, *King*. 300-850', Kunstl. 7466. A tree up to 100', of Lower Siam; in Peninsula 1b, 2d, 4f, 4g, 6g, 8g, 5h.

ANCISTROCLADACEAE.

Ancistrocladus pinangianus, *Wall*. 100-800', Wray 1862, Kunstl. 6452; fr. May, Aug. A bush or climber of Indo-China to Sumatra; in Peninsula common.

BIXACEAE.

Bixa orellana, *Linn*. At 4000', Anders. 87. The Arnotto. A bush, pantropic, of S. American origin; in Peninsula cultivated.

MALVACEAE.

Sida rhombifolia, *Linn*. At Taiping, Hend.; fr. and fruit all the year. An undershrub, pantropic, common through the Peninsula.

Urena lobata, *Linn*. 100-300'. Hend. 10051, 10148; fr. and fruit all the year. An undershrub, pantropic; in Peninsula common.

Hibiscus floccosus, *Mast*. 300-500', Kunstl. 7024; fruit Jan. A tree up to 80', endemic, 4d, 6d, 4f, 5f, 6g, 6j, 6k, 7k.

Hibiscus surattensis, *Linn.* At 200', Hend. 10049; fruit Jan. A sprawler of the Old World tropics; in Peninsula common.

Durio macrophyllus, *Ridl.* At about 3000', Ridl. 5352; flr. June. A tree up to 60', endemic, 4d, 3f, 6k.

Durio malaccensis, *Planch.* Larut. Forest Dept. 39; flr. Sept. A lofty tree, endemic, 6j, 6k.

Durio zibethinus, *Linn.* The Durian. A tree up to 100', of Indo-China and W. Malaysia, known only in cultivation.

Boschia Griffithii, *Mast.* 100-500'. Wray 2444, Kunstl 3303, 3496; flr. July, Sept. A tree up to 60' of Sumatra; in Peninsula common.

Neesia synandra, *Mast.* At Patu Kurau, Haniff 13265; flr. May. A tree up to 70', of Lower Siam; in Peninsula 2d, 6e, 4f, 8g, 5h, 9m.

Eriodendron anfractuosum, *DC.* Kapok. Commonly cultivated. A tree up to 70', pantropic.

STERCULIACEAE.

Sterculia bicolor, *Mast.* At Taiping, Wray 2378; flr. July. A tree up to 60', endemic, 6k.

Sterculia hyposticta, *Miq.* At 500', Hend. 10129; fruit Jan. A small shrub of Indo-China to Sumatra; in Peninsula common in the North.

Sterculia Kunstleri, *King.* 500-800', Kunstl. 4782; fruit Aug. A tree up to 70', endemic and local.

Sterculia laevis, *Wall.* 300-800', Kunstl. 3941, 4068; fruit March. A shrub about 6', of Tenasserim, Java, Borneo; in Peninsula common.

Sterculia parviflora, *Roxb.* At 300', Wray 2541; fruit July. A tree up to 60', of Sylhet, Burma and Cochin-China; in Peninsula common.

Sterculia parvifolia, *Wall.* 300-2300', Wray 2256, 1233, Kunstl. 3819, Ridl.; flr. June. A small tree, endemic, 2d, 5h.

Sterculia rubiginosa, *Vent.* 500-3500', Wray 2994 (var. *ensifolia*) Kunstl. 6189, H. & N. 2365; flr. Feb., fruit Sept. A small tree, of Indo-Malaya; in Peninsula, common from Penang to Singapore.

Scaphium longiflorum, *Ridl.* Waterfall Hill, Wray, fide Ridl. A tree, endemic and local.

Tarretia perakensis, *King.* 500-800', Kunstl. 3184. A tree up to 80', endemic, 5h.

Tarretia simplicifolia, *Mast.* At 300', Ridl., (fallen fruit-only). A lofty tree, endemic, 5h, 6j, 6k, 9m.

Helicteres Isora, *Linn.* At 100', Kunstl. 2268; fr. Aug. A shrub or small tree, of Indo-Australia and S. Africa; in Peninsula 2d, 8j.

Pterospermum Blumeum, *Korth.* At 300', Kunstl. 3390; fr. Sept. A tree up to 50', of Indo-Malaya; in Peninsula Langkawi to Singapore.

Byttneria Curtisii, *Oliv.* 100-500', Ridl. 14664, Hend. 10420, 10474; fr. Aug., fruit Feb., Oct. A slender climber, endemic, 2d.

Byttneria Maingayi, *Mast.* At Waterloo, Curt. 2890; fr. Oct. A woody climber, endemic and common in the South.

Leptonychia glabra, *Turcz.* 100-1000', Wray 1820, Kunstl. 2185 (var. *Mastersiana*), Curt., Hend. 10464; fr. Feb., May, Aug., fruit Feb., May. A shrub or small tree of Indo-Malaya; in Peninsula common.

TILIACEAE.

Brownlowia macrophylla, *King.* 200-500', Wray 2148, Kunstl. 6861; fr. June, Nov. A tree up to 40', endemic and local.

Pentace eximia, *King.* 500-800', Kunstl. 3482, 3649; fr. Oct., fruit Dec. A tree up to 70', endemic, 6k.

Pentace Kunstleri, *King.* At 100', Kunstl. 6811; fr. Nov. A tree up to 40', endemic, 6g.

Pentace macrophylla, *King.* At 100', Wray 1737. A tree up to 30', endemic and local.

Pentace perakensis, *King.* 300-1000', Kunstl. 3428; fr. Oct. A tree up to 40', endemic and local.

Pentace strychnoidea, *King.* 500-1000', Kunstl. 3478; fr. Oct. A tree up to 80', endemic and local.

Schoutenia Kunstleri, *King.* At Ulu Tupai, Wray 2692; fr. Aug. A tree up to 70', of Lower Siam; in Peninsula 2d, 6f.

Schoutenia Mastersii, *King.* 500-1000', Kunstl. 3381; fr. Sept. A tree up to 50', of Borneo; in Peninsula 2d, 6j, 6k.

Grewia antidesmaefolia, *King.* 300-500', Kunstl. 3051. A tree up to 40', of Lower Siam; in Peninsula 4d, 4f, 9k.

Grewia erythrocarpa, *Ridl.* At 300', Wray, fide Ridl. A small tree up to 14', endemic, 5g.

Grewia fibrocarpa, *Mast.* 200-2500', Wray 599, 2176, 2827; fr. June. A tree up to 50', endemic, 2d, 4f, 5g, 5h, 6j, 0j, 6k, 0k.

Grewia globulifera, *Mast.* At Taiping, Forest Dept. 1153. A large or small tree, of Borneo; in Peninsula, Penang to Singapore.

Grewia Miqueliana, *Kurz.* 2000-3200', Wray 4039, B. & H. 12791; fr. April, fruit March. A tree up to 40', endemic, Taiping to Johore.

Grewia umbellata, *Rorb.* 300-3900', Wray 4005, B. & H. 12936; flr. March. A climbing shrub of Siam, Java and Borneo; in Peninsula common.

Trichospermum cymbiforme, *Sprague.* Larut, Kunstl., fide Ridley. A tree up to 100', of Sumatra; in Peninsula 2d.

Trichospermum Kurzii, *King.* At 300', Wray 1970; flr. May. A tree up to 100', of Tenasserim; in Peninsula 4f, 5h, 5j, 6k.

Eleocarpus Barnardii, *Burkill.* At 100', Barnard; flr. Feb. A tree, endemic and local.

Eleocarpus Hullettii, *King.* 300-500', Kunstl. 3412; flr. Sept. A tree up to 40', endemic; in Peninsula 2d, 4f, 8j, 9m.

Eleocarpus Jackianus, *Wall.* 100-1000', Kunstl. 2520, 5515; flr. Feb. A tree up to 100', of Borneo; in Peninsula, common on the West.

Eleocarpus obtusus, *Bl.* At 2000', Forest Dept. C. F. 945; flr. Oct. A tree up to 40', of Indo-Malaya; in Peninsula common.

Eleocarpus paniculatus, *Wall.* At 100', Kunstl. 6215; flr. June. A tree up to 40', of Lower Siam, Bangka, Borneo; in Peninsula common.

Eleocarpus parvifolius, *Mast.* At 2500', H. & N. 2374; fruit Feb. A tree up to 100', of Lower Siam and Borneo; in Peninsula Penang to Singapore.

Eleocarpus pedunculatus, *Wall.* Taiping Hill, Ridl. 11917; fruit Feb. A tree up to 80', of Borneo; in Peninsula 2d, 6k, 9m.

Eleocarpus rugosus, *Rorb.* At 100', Kunstl. 7293; flr. March. A tree up to 100', of India; in Peninsula 2d, 4f, 9m.

Eleocarpus stipularis, *Bl.* 3500-4100', Kunstl. 6266, Derry, H. & N. 2348; flr. Feb. A tree up to 60', of W. Malaysia; in Peninsula common.

GONOSTYLACEAE.

Gonostylus Maingayi, *Hook. fil.* At 100', Kunstl. 6925; fruit Dec. A large tree, endemic, 2d, 4f, 6j, 6k, 9m.

LINACEAE.

Ixonanthes reticulata, *Jack.* 200-300', Hend. 10438; flr. Jan. A shrub up to 8', of Borneo; in Peninsula 2c, 2d, 3f, 5h, 7k, 7l, 9m.

OXALIDACEAE.

Oxalis corniculata, *Linn.* At 3600', B. & H. 12649; fruit March. A creeping herb, cosmopolitan; in Peninsula common near houses.

Oxalis corymbosa, DC. At 3400', B. & H. 12820; flr. March. A creeping herb, said to be of Mascarene origin; in Peninsula running wild here and on Penang Hill.

Connaropsis laxa, Ridl. Taiping Hills, Kunstl., Curt., fide Ridl. A tree up to 50', endemic and local.

Connaropsis macrophylla, King. 200-2500', Ridl. 2981, Anders., Hend. 10071, 10321, 10475, B. & H. 12824; flr. Jan.-March, Aug. Shrub or small tree, endemic, 2c, 2d, 3d, 3f, 4f, 8g, 9m.

Dapania scandens, Stapf. At about 1000', Wray 2078, 3146, Curt. 2724; flr. May, fruit June. A woody climber of Sumatra and Borneo; in Peninsula 4f.

BALSAMINACEAE.

Impatiens Curtisii, Hook. fl. 2300-4000', Curt. 1348, Ridl. 1953, B. & H. 12806; flr. Feb., Dec. A herb, endemic and local.

Impatiens Holstii, Engl. and Warb. At Maxwell's Hill, B. & H. A Trop. African species, cult. and running wild here.

RUTACEAE.

Evodia latifolia, DC. 300-2000', Wray 1819, 2567, Ridl. 3008, 14683; flr. July, Aug. A tree of 20', of W. Malaysia; in Peninsula 2d, 4e, 3f, 6i, 5h, 6j, 6k, 7l.

Evodia macrocarpa, King. At 100', Kunstl. 7489; fruit April. A tree up to 50', endemic, 2d, 5g.

Evodia malayana, Ridl. Wray 3126, Scott. 154, Forest Dept C. F. 5653; flr. March, Oct. A bush or small tree, endemic, 1b, 6h, 2d, 3f, 8h, 6k, 9m.

Evodia pilulifera, King. At about 2000', Wray 2995, Ridl. A shrub up to 15', endemic, 4f, 5g, 5h, 7k.

Tetractomia Roxburghii, Hook. fl. 100-4700', Wray 2106, Kunstl. 6194, Derry, B. & H. 12583; flr. June, fruit March, June. A tree up to 80', endemic, 2d, 5g.

Acronychia Porteri, Hook. fl. 300-500', Kunstl. 7469; fruit April. A tree up to 70', of Lower Siam; in Peninsula 2d, 8g, 5h, 6j, 6k, 9m.

Glycosmis macrophylla, Lindl. 500-1000', Kunstl. 2549; flr. Nov. A shrub up to 10', endemic, 2d.

Glycosmis malayana, Ridl. 100-4000', Kunstl. 2327, 2839, Anders. 129, Hend. 10125, B. & H. 12903, 13026; flr. Jan., March, Nov., fruit Feb., March. A shrub, endemic, Lang'awi to Singapore.

Glycosmis puberula, Lindl. 2000-4500', Ridl. 3006, 3011. A shrub of Lower Siam and the Philippines; in Peninsula 1b, 2c, 2d, 8h, 6k, 9m.

Micromelum pubescens, *Bl.* At Ulu Tupai, Wray 2682; flr. Aug. A large shrub or small tree of Indo-Australia and China; in Peninsula common.

Clausena excavata, *Burm.* Up to 2000', Wray 3320, Ridl.; flr. Feb. A foetid shrub or small tree of Indo-Malaya to the Philippines; in Peninsula common.

Luvunga eleutheranthera, *Dalz.* At 2500', Wray 2977, 3215. A liane of Indo-Malaya; in Peninsula 2d, Pahang, 9l, 9m.

Luvunga scandens, *Ham.* At 3800', B. & H. 12999; flr. March. A liane of Indo-Malaya; in Peninsula 2d, 3f, 8h, 8k.

SIMARUBACEAE.

Brucea sumatrana, *Rorb.* At Waterloo, Curt. 134; flr. Dec. A shrub up to 6', of Indo-Australia; in Peninsula common.

Eurycoma apiculata, *Benn.* 2500-3400', Ridl., B. & H. 12707; flr. March, fruit June. A shrub up to 8', endemic, 2d, 4e, 3f, 5g, 5h, 9k.

Eurycoma longifolia, *Jack.* 300-3000', Kunstl. 4075, 7244, 7548, Hendl. 10131; flr. Jan. Feb., fruit March, April. A shrub or small tree of Indo-Malaya; in Peninsula common.

OCHNACEAE.

Gomphia corymbosa, *Ridl.* 1500-2000', Kunstl. 7310; flr. Jan. A shrub or small tree, endemic, 2d, 4f, 9m.

Gomphia sumatrana, *Jack.* Larut, Kunstl., fide Ridl. A tree about 40', of Tenasserim, Sumatra and Borneo; in Peninsula common.

Tetramerista glabra, *Miq.* At 300', Wray 2129. A tree up to 60', of Sumatra and Borneo; in Peninsula common.

BURSERACEAE.

Canarium denticulatum, *Bl.* Larut Hills, Kunstl., fide Ridl. A tree up to 70', of Java; in Peninsula 4f.

Canarium kadondon, *Benn.* At 100', Kunstl. 6707, 7577; flr. Oct., fruit May. A tree up to 50', endemic and common.

?**Canarium littorale**, *Bl.* 2000-2500', Kunstl. 6998, fide Ridl. A doubtful spec. "It closely resembles *C. littorale*, *Bl.* of Java, but the single specimen is insufficient to be certain of." (Ridley).

Canarium parvifolium, *Benn.* 3000-3500', Kunstl. 2618; fruit Dec. A lofty tree, endemic, 4f, 6k, 9m.

Canarium pilosum, *Benn.* var. *hirtellum*, *Ridl.* Up to 500', Wray 2645, Haniff 13129; flr. March, Aug., fruit March. A tree up to 60', endemic, the var. at 2d, 4f, the species at 5h, 6k, 9m.

Canarium rufum, *Benn.* At Kota, Wray 3325; fruit Feb. A tree up to 60', endemic, 3d, 3f, 4f, 5g, 5h, 8h, 6k, 9m.

Santiria apiculata, *Benn.* 300-500', Kunstl. 3556, 3760; fruit Jan. A tree up to 60', endemic, 4f, 6f, 6g, 5h, 6j, 6k, 9l, 9m.

Santiria fasciculata, *Benn.* 100-800', Kunstl. 3319, 3500, 6610, 6832 (var. *puberula*); flr. Sept., fruit Sept.-Nov. A tree up to 50', endemic, 2d, 6e, 6g, 5h, 6k.

Santiria laevigata, *Bl.* At 100', Kunstl. 5441; fruit June. A tree up to 150', of Sumatra; in Peninsula 4f, 5h, 7h, 8h, 5j, 6j, 6k, 9m.

Santiria laxa, *King.* 300-800', Kunstl. 3192, 3516; flr. Aug. fruit Oct. A tree up to 90', endemic, 2d, 6e, 5h, 6j, 6k, 9k, 9m.

Santiria longifolia, *King.* 100-800', Kunstl. 3594, 6838; fruit Nov. A tree up to 20', endemic, 2d.

Santiria macrocarpa, *King.* At 100', Kunstl. 5304; fruit Dec. A tree up to 80', endemic and local.

Santiria multiflora, *Benn.* 300-800', Kunstl. 4988; fruit Oct. A tree up to 60', of Borneo; in Peninsula 4f, 5h, 7h, 8h, 6k, 9m.

Santiria oblongifolia, *Bl.* 100-1000', Kunstl. 6602, 8472; flr. Sept., fruit Feb. A tree up to 80', of W. Malaysia; in Peninsula 2d, 4f, 6k.

Santiria Wrayi, *King.* 800-1000', Kunstl. 3689; fruit Dec. A tree up to 30', endemic, 4f, 5h, 6j, 7l.

Icicaster Planchoni, *Ridl.* At 100', Kunstl. 5545; fruit Feb. A tree up to 60', endemic, 4f, 5h, 6k, 9m.

MELIACEAE.

Sandoricum indicum, *Cav.* 300-500', Kunstl. 8297; fruit Nov. A tree up to 80', of Indo-Malaya; in Peninsula common in villages.

Sandoricum nervosum, *Bl.* At Kota, Wray 3345; flr. Feb. A tree up to 80', of Sumatra. Java and Philippines; in Peninsula common in cultivation.

Megaphyllaea annulata, *Ridl.* At 3000'. Curt. 2692, Ridl. 11963; flr. May. A tree, endemic and local.

Megaphyllaea perakensis, *Hemsl.* 2500-3800', Wray, Kunstl. 5305, 6317, Ridl. 5358, B. & H. 12985; flr. March, fruit June, July, Dec. A tree up to 40', endemic and local.

Chisocheton macrothyrsus, *King.* 2500-4000', Wray, Scort. 82, Curt. 2002; flr. Nov., fruit Sept. A tree up to 40', endemic, 5h.

Chisocheton penduliflorus, *Planch.* At about 2000', Wray 3244, Scort. 48, Ridl., Derry. A shrub or small tree, endemic, 2d 4f, 6j, 6k, 7l.

Chisocheton rubiginosus, *King*. 300-500', Kunstl. 3848, 5095; fr. March, fruit Nov. A tree up to 60', endemic and local.

Dysoxylum cauliflorum, *Hiern*. 600-1000', Kunstl. 3267; fr. Aug. A tree about 60', of Borneo and Philippines; in Peninsula 2d, 4c, 5h, 0j, 6k, 9m.

Dysoxylum costulatum, *Miq.* 1500-2900', Kunstl. 6791, B. & H. 12690; fruit March, Nov. A tree up to 50', of Sumatra; in Peninsula common.

Dysoxylum densiflorum, *Miq.* 3000-3200', Wray 4323, Derry. A tree up to 40', of Sumatra and Java; in Peninsula 4f, 5g, 9m.

Dysoxylum interruptum, *King*. 3000-4000', Kunstl. 6349. A tree up to 40', endemic and local.

Dysoxylum macrothyrsus, *Miq.* var. *microbotrys*, *Ridl.* 500-800', Kunstl. 6788; fr. Nov. A tree up to 60', of Borneo and Java; in Peninsula the var. at 4f, the species at 4f, 5g, 5h, 6j, 6k, 9m.

Dysoxylum rugulosum, *King*. 300-500', Kunstl. 2863, 3158; fruit Aug. A tree up to 25', endemic, 5g.

Amoora Maingayi, *Hiern*. Larut, Kunstl., fide Ridl. A tree up to 35', endemic, 5h, 6k.

Amoora Ridleyi, *King*. At 100', Kunstl. 5383; fruit Dec. A tree up to 100', endemic, 4f, 6g, 8j, 6k.

Amoora rubescens, *Hiern*. Larut, Forest Dept. C. F. 257; fr. May. A tree up to 60', endemic, 2d, 4f, 6j, 6k, 8l, 9m.

Amoora rubiginosa, *Hiern*. 100-200', Kunstl. 6221; fr. June. A tree up to 100', endemic, 6k, 9m.

Aphanamixis Rohituka, *Pierre*. At about 2500', *Ridl.* (not seen). A tree up to 70', of Indo-Malaya and China; in Peninsula common.

Aphanamixis sumatrana, *Ridl.* At about 2000', Wray 2216, 2990, *Ridl.* A tree up to 20', of Sumatra; in Peninsula 2d, 4c, 3f, 4f, 5h, 6k.

Aglaiia cinerea, *King*. 3000-3500', Kunstl., fide *Ridl.* A shrub or small tree, endemic, 5g.

Aglaiia cordata, *Hiern*. 2000-3000', Wray 2982, 2962A, Kunstl. 6360, *Curt.*, *Ridl.* 11915; fr. May, fruit Feb., July. A tree up to 30', of Borneo; in Peninsula 1h, 4d, 6g, 4h, 6k, 9m.

Aglaiia Griffithii, *Kurz.* 1000-4000', Wray 2224, Kunstl. 4321, 6341, 6889, *Ridl.* 3021; fr. Feb., July, fruit Nov. A tree up to 50', endemic and common.

Aglaiia Hiernii, *King*. At 100', Kunstl. 6706; fr. Oct. A tree up to 100', endemic, 4f, 6k.

Aglaiia Kunstleri, *King*. At 300', Kunstl. 5287; fruit Dec. A tree up to 60', endemic, 4f, 5g.

Aglaiia leucophylla, *King*. Larut, Kunstl., fide Ridl. A tree up to 60', endemic and local.

Aglaiia macrostigma, *King*. 500-800', Kunstl. 5474; fruit Jan. A tree up to 60', endemic and local.

Aglaiia membranifolia, *King*. 500-800', Kunstl. 5159; fr. Nov. A tree up to 30', of Sumatra; in Peninsula 4f.

Aglaiia odoratissima, *Bl.* 300-3800', Wray 2664, 3202A, 2959, Kunstl. 3507, Ridl. 14679, B. & H. 12968; fr. March, June. A tree up to 40', of Siam to Java; in Peninsula common.

Aglaiia oligophylla, *Miq.* Larut, Kunstl., fide Ridl. A tree up to 20', of Burma and Sumatra; in Peninsula 2d, 6k, 7l, 9m.

Aglaiia palembanica, *Vig.* 300-4200', Kunstl. 3882, Curt. 2003, B. & H. 13024; fr. Sept., fruit Feb. A shrub or tree up to 20', of Sumatra and Borneo; in Peninsula 1l 2d, 4e.

Aglaiia tenuicaulis, *Hiern*. Up to about 2500', Kunstl. 3091, Ridl. A shrub or small tree of Sumatra; in Peninsula 2d, 5g, 5h, 6j.

Aglaiia trichostemon, *C. DC.* At Maxwell's Hill, Ridl. (not seen). A tree about 20', of Borneo; in Peninsula 2d, 6e, 5g, 7h, 6j, 6k, 9m.

Walsura multijuga, *King*. 100-1500', Wray 1859, 2568, 4183, Kunstl. 3446, 6915, 8400; fr. Dec., fruit June, July, Dec. A tree up to 30', of Sumatra, Borneo and Philippines; in Peninsula 2d, 4f, 5h, 6k, 9m.

Heynea trijuga, *Roxb.* At 500', Wray 1860, Kunstl. 3971; fruit March. A tree up to 20', of Indo-Malaya and China; in Peninsula 2d, 0j, 9m.

CHAILLETIACEAE.

Chailletia deflexifolia, *Turcz.* 300-800', Kunstl. 5501; fruit Feb. A climber up to 70', of Java; in Peninsula 3f, 4f, 6k, 8l.

Chailletia tenuifolia, *King*. 300-2000' (fide Ridl.), Wray 1850. A shrub or small tree up to 15', endemic, 3d.

OLACACEAE.

Ctenolophon parvifolius, *Oliv.* Ridl. 11433; fruit Dec. A tree up to 40', of Sumatra and Borneo; in Peninsula common.

Scorodocarpus borneensis, *Becc.* Larut Hills, Kunstl., fide Ridl. A tree up to 70', of Borneo; in Peninsula 3f, 8g, 5h, 8j, 8h, 9l, 9m.

Strombosia javanica, *Bl.* At Waterloo, Cart., fide Ridl. A tree up to 30', of Tenasserim to Borneo; in Peninsula 2d, 4f, 6g, 5h, 6k, 0k, 9m.

Strombosia rotundifolia, *King*. At Taiping, Burn-Murdoch 332; fruit May. A large shrub, endemic, 6g, 8j, 9m.

Platea latifolia, *Bl*. 300-500', Kunsth. 5885; fruit April. A tree up to 100', of Java; in Peninsula 2d.

Gomphandra affinis, *Mast*. 100-1000', Curt. 2721, Ridl. 14680; flr. May, fruit Aug. A shrub about 8', of Burma; in Peninsula common.

Gomphandra gracilis, *King*. 200-2500', Wray 2138, 3002; fruit June. A shrub or small tree, endemic, 4f.

Gomphandra lanceolata, *King*. 1700-4700', Wray 2829, Kunsth. 4211 (var. *angustifolia*), 4240, Ridl. (var. *a*, Burkill), B. & H. 12656, 12801; flr. March, May, June. A shrub up to 10', endemic and common. Var. *a*, Burkill does not fit in with any of Ridley's varieties. It occurs also in Negri Sembilan, and on Bukit Kutu, and G. Berumban.

Gomphandra nyssifolia, *King*. 4000-4500', Kunsth. 3822; fruit Jan. A tree up to 20', endemic, 4d.

Gomphandra penangiana, *Wall*. At 300', Wray 2667. A shrub up to 8', endemic, 2d, 5g, 6j, 6k.

Gomphandra sp. 3000-4200', Fox 161, Ridl.; flr. Oct. A shrub. Does not agree with any species in Ridley. Near *G. gracilis*.

Stemonurus umbellatus, *Becc*. 3000-3500', Kunsth., fide Ridl. A tree up to 120', of W. Malaysia; in Peninsula 6k.

Phytocrene bracteata, *Wall*. 3000-3500', Kunsth. 6911; flr. Dec. A long prickly climber of Burma and Borneo; in Peninsula 2d, 6k, 0k, 9m.

Phytocrene oblonga, *Wall*. At 100', Kunsth. 5606; flr. Feb. A liane, endemic, 2d, 6k.

Phytocrene palmata, *Wall*. At 100', Kunsth. 5560; fruit Feb. A liane, endemic, 2d, 5h, 6k.

Miquelia caudata, *King*. At about 2500', Ridl. 5229. A slender climber, endemic, 8f, 5g.

Iodes ovalis, *Bl*. Larut, Kunsth., fide Ridl. A climber up to 60', of Malaysia; in Peninsula 4g, 6k, 9l.

Iodes velutina, *King*. At 200', Seort. A woody climber, endemic, 6j, 6k, 9m.

Lophophyxis Maingayi, *Hook. fil.* 200-500', Kunsth. 6552. A liane, endemic, 5g, 6k.

Erythralium scandens, *Bl*. To about 2500', Wray, Curt. 2777. Ridl.; flr. June, Oct. A woody climber of Indo-Malaya; in Peninsula 2d, 3f, 4f, 8g, 6k, 9m.

ILICACEAE.

Ilex cymosa, *Bl.* 800-1000', Kunstl. 8506; fr. Feb. A tree up to 50', of Indo-Malaya; in Peninsula common.

Ilex epiphytica, *King.* At about 2500', Ridl. 3008. A shrub of Borneo; in Peninsula 4e, 6e, 5g, 5h, 7k.

Ilex glomerata, *King.* 3500-4000', Kunstl. 6926; fr. Dec. A tree up to 30', of Tenasserim and Java; in Peninsula 3e only.

Ilex malaccensis, *Loesen.* At 300', Kunstl. 2463; fr. Oct. A shrub up to 18', of Sumatra and Borneo; in Peninsula 6k.

Ilex triflora, *Bl.* 3000-4600', Kunstl. 6991, Ridl. 5376, Anders. 67; fr. March, June, fruit Dec. A bush up to 15', of Indo-Malaya and China; in Peninsula 2c, 4d, 4e, 6e, 4f, 5g, 7k, 9k.

CELASTRACEAE.

Microtropis elliptica, *King.* 300-4500', Kunstl. 4193, Ridl.; fruit May. A shrub or small tree, endemic, 2d, 4f, 9k.

Microtropis filiformis, *King.* At about 2500', Ridl.; fr. June. A shrub or small tree of Burma and Lower Siam; in Peninsula 1b, 2b, 3f, 4f, 5h,

Glyptopetalum quadrangulare, *Prain.* At 2500', Wray 3229. A shrub up to 15', endemic, 4f, 6g, 5h.

Lophopetalum pachyphyllum, *King.* 800-1500', Kunstl. 7525; fr. April. A tree up to 100', endemic, 6j, 6k.

Lophopetalum Scortechinii, *King.* 500-1000', Kunstl. 6676; fr. Oct. A tree up to 80', endemic and local.

Celastrus malayensis, *Ridl.* 3000-4100', Curt. 2005, Ridl. 5237, H. & N. 2466; fruit Feb., June. A climber up to 50', endemic, common.

Kurrimia paniculata, *Wall.* 100-1000', Wray 2376, 2386, Kunstl. 4111, 5772, 6501; fr. July, Aug., fruit Apr., Nov. A tree up to 60', of W. Malaysia except Java; in Peninsula, Kedah to Singapore.

Perrottetia alpestris, *Loesen.* 3900-4400', Curt. 2090, Fox 171, Ridl. 3013, 5512, 11451, B. & H. 12556; fruit March. A shrub up to 13', of W. Malaysia and Philippines; in Peninsula 4f, 5g.

Hippocratea nigricaulis, *Ridl.* 300-500', Kunstl. 6556; fr. Sept. A slender climber of Burma; in Peninsula 2d, 5h, 6k, 8l

Salacia flavescens, *Kurz.* At about 4000', Curt. 2004. A sprawler of Tenasserim and Lower Siam; in Peninsula Setul to Singapore.

Salacia Maingayi, *Laws.* 500-800', Kunstl. 7471; fr. April. A climber up to 15', endemic, 2d, 6d, 5g.

Salacia prinoides, DC., var. *macrophylla*, King. 300-500', Kunsth. 7552; fruit May. A climber or bush, the species of Indo-Malaya and the Philippines; in Peninsula the species at 2b, 2c, 3f, 6k, 9m, the var. at 3e only.

Salacia Wrayi, King. At Kota, Wray, fide Ridl. A liane, endemic and local.

RHAMNACEAE.

Zizyphus affinis, Hemsl. 300-1500', Kunsth. 3568, 6720, Ridl. 11434; flr. Oct., Dec., fruit Nov. A thorny climber, endemic, 1b, 2d, 3f.

Zizyphus calophylla, Wall. At 300', Kunsth. 5255; flr. & fruit Dec. A thorny climber, of Bangka and Borneo; in Peninsula common.

Zizyphus Kunstleri, King. 300-500', Kunsth. 3772, Ridl. 3005; fruit Jan. A thorny climber, endemic, 2d, 3f, 9l.

Zizyphus oenoplia, Mill. At 500', Kunsth. 5276; fruit Dec. A thorny bush of Indo-Australia; in Peninsula 1b, 2b, 2d, 6d, 6f, 5h, 5j, 6k, 9m.

Colubrina anomala, King. 500-800', Kunsth. 6561; flr. Sept. A tree up to 40', endemic and local.

Ventilago malaccensis, Ridl. At 100', Kunsth. 6573; fruit Sept. A woody climber of Lower Siam and Borneo; in Peninsula 1b, 2d, 6g, 7g, 6k, 9m.

Ventilago oblongifolia, Bl. At Waterfall Hill, Wray, Scott., fide Ridl. A liane of Java and Philippines; in Peninsula 5g, 5h, 6j, 9l, 9m.

Smythea macrocarpa, Hemsl. 200-2000', Wray 36, 2211, Kunsth. 3642, 6597, 7726; flr. June, Sept., fruit June, Dec. A liane, endemic, 2d, 4f, 6k, 7l, 9l.

AMPELIDACEAE.

Vitis cantoniensis, Seem. 1500-2000', Kunsth. 2285; flr. Sept. A slender vine of Indo-China and China; in Peninsula 5h, 6j, 7l.

Vitis cinnamomea, Wall. 300-500', Wray 2925, Kunsth. 2912; flr. April. A slender vine, endemic, Kedah to Singapore.

Vitis elegans, Kurz. 500-3700', Hend. 10471, B. & H. 12789; flr. Feb. A vine, endemic and common. Hend. 10471 is a large form, connecting this species with *V. cinnamomea*.

Vitis furcata, Laws. 200-about 2500', Kunsth. 8402 (var. *pubescens*), Ridl., H. & N. 2398; flr. June, fruit Jan., Feb. A woody vine of Sumatra; in Peninsula, Penang to Singapore.

Vitis glaberrima, Wall. 100-4400', Kunsth. 6212, Fox 151; flr. Oct., fruit June. A long vine of Tenasserim to Sumatra; in Peninsula 2d, 4h, 5h, 8h, 6k, 7l, 9l, 9m.

Vitis Kunstleri, *King*. Larut, Kunstl., fide Ridl. A climber of Lower Siam; in Peninsula 4f, 7g.

Vitis Lawsoni, *King*. 2500-3000', Kunstl. 6827, Ridl. 5238; flr. July, fruit June. A climber of Burma; in Peninsula 2d, 4f, 5g, 5h, 9m.

Vitis macrostachya, *Miq.* At 100', Kunstl. 6238; flr. June. A climber of Sumatra; in Peninsula Penang to Singapore.

Vitis mollissima, *Wall.* 3700-3800', B. & H. 12983; fruit March. A wide climber of Lower Siam; in Peninsula Langkawi to Singapore.

Vitis novemfolia, *Wall.* At Maxwell's Hill, Ridl. 5235; flr. June. A slender vine of Tenasserim; in Peninsula 2d, 3f, 4f, 6f, 7g, 6j, 0j, 6k, 9m.

Vitis peduncularis, *Wall.* 100-800', Kunstl. 3970, 5364; fruit March, Dec. A climber of Sumatra and Borneo; in Peninsula 2d, 6d, 5h, 6j, 6k.

Vitis polystachya, *Wall.* 3000-3500', *Scort.* 244, *Ridl.* 2999, *H. & N.* 2367; flr. March, fruit Feb. A climber of Siam to Sumatra; in Peninsula 2d, 4f, 5h, 6j, 6k, 8l, 9l.

Vitis pyrrhodasys, *Miq.* Larut, Kunstl., fide Ridl. A slender vine of W. Malayia; in Peninsula 2c, 6c, 2d, 5g, 5h, 6k, 8l, 9l.

Vitis repens, *Wight and Arnott*. At 4400', *Fox* 135. flr. Oct. A climber of S. E. Asia; in Peninsula Kedah and Kelantan to Singapore.

Vitis Scortechinii, *King*. 800-1000', Kunstl. 2897; flr. March. A slender climber, endemic, 6d, 4f, 5h.

Vitis trifolia, *Linn.* 300-4750', *Ridl.*, *B. & H.* 12945; fruit March. A vine of India, Lower Siam and Java; in Peninsula common.

Vitis Wrayi, *King*. Taiping Hills, *Scort.*, fide *Ridl.* A slender climber of Lower Siam; in Peninsula 2d, 3f, 5h, 6j, 6k, 9i.

Pterisanthes coriacea, *Korth.* Up to 4000', *Curt.* 2006, *Ridl.* 3001; flr. May, Sept., Dec. A slender climber of Lower Siam; in Peninsula Taiping to Singapore.

Pterisanthes eriopoda, *Planch.* Taiping Hills, *Ridl.* (not seen). A slender climber of Sumatra; in Peninsula 2d, 3d, 4f.

Pterisanthes pedata, *Laws.* At 2500', *Haniff* 13208; fruit March. A short climber, endemic, 5h, 6j, 6k, 9l.

Leea Curtisii, *King*. At Waterloo, 1800', *Curt.* 2872. A shrub up to 5', endemic, 4d.

Leea gigantea, *Griff.* 100-1000', *Ridl.* 14649; flr. Aug. A bush or small tree, endemic, Langkawi to Singapore.

Leea sambucina, Willd. At 300', Wray 3282. A big shrub of India to Sumatra; in Peninsula common.

Leea simplicifolia, Zoll. 2000-2500', Kunstl., fide Ridl. A dwarf shrub, of Sumatra and Java; in Peninsula 4d.

SAPINDACEAE.

Allophyllus glaber, Roxb. At Maxwell's Hill, Scott., fide R dl. A small tree, endemic, common.

Allophyllus ternatus, Lour. At 2000', Scott. 290. A shrub up to 10', of Indo-China and Malaysia; in Peninsula common.

Erioglossum edule, Bl. At Kota, Wray 3344. A tree of Indo-Australia; in Peninsula in villages and open country.

Lepisanthes cuneata, Hiern. Larut, Kunstl., fide Ridl. A shrub or small tree, endemic, 2d, 4e, 3f, 4f, 7h, 6j.

Lepisanthes longifolia, Radlk. 1500-2000', Kunstl. 8465; fruit Feb. A shrub up to 20', endemic, 2d, 6g, 8j, 6k, 7l, 9l.

Otophora sessilis, King. 300-800', Kunstl. 2460; flr Oct. A shrub or small tree of Lower Siam; in Peninsula 1b, 2d.

Nephelium lappaceum, Linn. The Rambutan. A tree up to 50', of W. Malaysia; in Peninsula cultivated and occurring as an escape.

Nephelium mutabile, Bl. 200-500', Kunstl. 6478; flr. Aug. A small tree of W. Malaysia and Philippine-; in Peninsula 6f, 5g, 5h, 9m.

Nephelium ophioides, Radlk. Kunstl. Larut, fide Ridl. A tree up to 80', endemic, 4f, 5h, 6k.

Nephelium rubescens, Hiern. At 100', Kunstl. 6523, 6750; flr. Aug., fruit Oct. A tree up to 60', endemic, 3f, 4h, 6k, 7l, 9m.

Nephelium setosum, Ridl. *Euphoria setosa*, Radlk. 1000-2000', Kunstl., fide Ridl. A doubtful species.

Nephelium sp. At 3800', B. & H. 13008; fruit March. A lofty tree. Near *N. glabrum*.

Pometia alnifolia, Radlk. 500-800', Kunstl. 3781; flr. Jan. A tree up to 60', endemic, 2d, 4f, 5h, 9m.

Guioa fuscidula, Radlk. 200-500', Kunstl. 2452; flr. Oct. A tree up to 40', of Tenasserim; in Peninsula 3e only.

Mischocarpus sumatranus, Bl. 100-4000', Kunstl. 4689, 5391. 8329, Ridl.; flr. Jan., fruit Feb., April. A tree up to 70', of Indo-Malaya; in Peninsula 2d, 6d, 5h, 9m.

Paranephelium macrophyllum, King. 300-500'. Kunstl. 3204, 6436; flr. and fruit Aug. A tree up to 100', endemic, 4d, 4e, 4f, 0j, 6k, 9m.

STAPHYLEACEAE.

urpinia latifolia, Wall. 200-500', Wray 2172, Kunstl. 8487; fr. Feb., fruit June. A tree up to 40', endemic, 2d, 5g, 8g, 5h, 6k, 7, 9m.

urpinia pomifera, DC. 3000-4000', Kunstl. 4243; fruit May. tree up to 40', of Indo-Malaya and China; in Peninsula 3e only.

SABIACEAE.

abia sumatrana, Bl. At 1800', Kunstl. 2117; fr. and fruit uly. A climber of Sumatra; in Peninsula 3e only.

heliosma elliptica, Hook. fil. At 100', Kunstl. 5468; fr. Jan. tree up to 30', of Sumatra and Java; in Peninsula 4f, 5h, 6k, m.

heliosma nitida, Bl. 500-2500', Wray 3243, Kunstl. 2707, 2842, 895, Curt.; fr. Jan., May, fruit March, Sept. A shrub or small tree of Sumatra and Java; in Peninsula 2d, 4f, 3g, 5g, 4h, 5h, 5j, k, 9l.

ANACARDIACEAE.

Buchanania sessiliflora, Bl. 300-800', Wray 2402, 2558, 2642, Kunstl. 6593; fr. Sept., fruit Aug. A tree up to 60', of Burma and W. Malaysia; in Peninsula common.

Bouea microphylla, Griff. At 300', Kunstl. 5531; fr. Feb. A tree up to 80', of Malaysia; in Peninsula only doubtfully wild at 2d, 8g, 6k, 9m.

Mangifera Griffithii, Hook. fil. 300-500', Kunstl., fide Ridl. A tree up to 100', endemic, 6k.

Mangifera quadrifida, Jack. 200-300', Kunstl. 8444; fr. Jan. A tree up to 60', of Borneo; in Peninsula 2d, 8g.

Mangifera longipetiolata, King. 2500-3000', Kunstl. 7266; fr. Feb. A tree up to 60', endemic and local.

Melanorrhoea aptera, King. 300-500', Kunstl. 3485, 3727; fr. Oct. A tree up to 70', endemic, 2d, 6g.

Melanorrhoea Curtisii, Oliv. 800-1000', Kunstl. 6887; fr. Nov. A tree up to 80', endemic, 2c, 2d, 5g.

Melanorrhoea inappendiculata, King. Larut, Kunstl., fide Ridl. A tree up to 60', endemic, 2d.

Melanorrhoea macrocarpa, Engl. 3000-4000', Curt. 3722; fruit Dec. A tree of Borneo; in Peninsula 3e only.

Melanorrhoea torquata, King. At 100', Kunstl. 5552; fr. Feb. A tree up to 100', endemic, 3f, 8g, 8j.

Swintonia lurida, King. At Kota, Wray, fide Ridl. A small tree, endemic, 6k.

Swintonia spicifera, *Hook. fl.* 300-1500', Kunstl., fide Ridl. B. & H. A tree up to 100', endemic, 2c, 2d, 6j, 6k, 7k

Campnosperma Griffithii, *March.* At 100', Kunstl. 6541; fr. Sept. A tree about 80', of Sumatra and Borneo; in Peninsula 6k, 9m.

Rhus perakensis, *Scort.* At 300', Wray 2316. A slender climber, endemic, 6g.

Melanochyla angustifolia, *Hook. fl.* 300-500', Kunstl. 3359; fr. Sept. A tree up to 70', endemic, 2d, 6j, 6k.

Melanochyla bracteata, *King.* At 100', Kunstl. 5549, 7303; fr. and fruit Feb. A tree up to 80', endemic, 4f.

Melanochyla densiflora, *King.* At 100', Kunstl. 5615; fr. Feb. A tree up to 80', endemic and local.

Melanochyla Kunstleri, *King.* 300-500', Kunstl. 6810; fr. Nov. A tree up to 100', endemic and local.

Melanochyla nitida, *King.* 1000-1500', Kunstl., fide Ridl. A tree up to 100', endemic, 2d.

Semecarpus lucens, *King.* At 100', Kunstl. 5470, 6895; fr. Jan., Nov. A tree up to 70', endemic and local.

CONNARACEAE.

Connarus ellipticus, *King.* At 300', Wray 1831. (Up to 4200', Kunstl., fide Ridl.) A climber, endemic, Penang to Singapore.

Connarus oligophyllus, *Wall.* 200-500', Kunstl. 5613, 8432. fr. Jan., fruit Feb. A climber of Lower Siam; in Peninsula 2d, 4f, 7g, 5h, 8h, 6k, 9m.

Connarus villosus, *Jack.* 800-1500', Wray 1838, Kunstl. 5586; fruit Feb. A liane of Sumatra and Borneo; in Peninsula common.

Ellipanthus gibbosus, *King.* At Waterloo, Curt.; fruit May. A tree up to 16', endemic, 4f, 5g, 9k, 9l.

Ellipanthus Griffithii, *Hook. fl.* At 300', Wray 2404. A tree up to 60', of Borneo; in Peninsula 4f, 6k, 9m.

Rourea anomala, *King.* At Taiping, Haniff 1262; fr. May. A big liane of Lower Siam; in Peninsula 2d, 6d, 4e, 4f.

Rourea rugosa, *Planch.* 300-500', Kunstl. 8406; fr. Jan. A liane, endemic and common.

Rourea similis, *Bl.* 100-500', Kunstl. 5516, 8405, fr. Jan., Feb. A liane of Sumatra and Borneo; in Peninsula 2c, 2d, 4f, 5h, 6k, 9k, 9m.

Roureopsis Scortechinii, *King.* 4000-4500', Curt. 1998, H. & N. 2465; fruit Feb., Sept. A slender climber, endemic and local.

Agelaea pinnata, *King*. At 500', Kunstl. 5425; fr. Jan. A liane, endemic and local.

Agelaea vestita, *Hook. fil.* 100-300', Wray 2538, 2549; fr. July. A liane of W. Malaysia; in Peninsula common.

Cnestis ramiflora, *Griff.* At 300', Kunstl. 3759; fruit Jan. A climber of Indo-Malaya; in Peninsula common.

LEGUMINOSAE.

Crotolaria incana, *Linn.* At Taiping, Hend. 10162; fr. and fruit Feb. A shrubby herb, cosmopolitan; in Peninsula 2d.

Crotolaria semperflorens, *Vent.* At 4100', B. & H. 12867; fr. and fruit Feb. A herb of S. India, Sumatra and Java; in Peninsula 6j, 6k.

Flemingia congesta, *Roxb.* At Taiping, Hend. 10161; fr. and fruit April. A small shrub of Indo-Malaya and China; in Peninsula common.

Phaseolus calcaratus, *Roxb.* At Batu Kurau, Curt. 2984; fr. Oct. A twining herb of S. E. Asia; in Peninsula 2b, 6b, 6f, 5g.

Spatholobus ferrugineus, *Benth.* At 300', Kunstl. 3366; fr. Nov. A big liane of W. Malaysia; in Peninsula 2d, 4f, 6k, 8k, 9m.

Spatholobus Maingayi, *Prain.* 500-800', Kunstl. 6906; fr. Dec. A climber, endemic, 4f, 6k, 9l, 9m.

Mucuna bicipitata, *Teyss. and Binn.* At Taiping, Hend. 10136, 10373; fr. Jan., fruit Feb. A liane of Sumatra and Borneo; in Peninsula 1b, 2d, 4d, 6f, 5g, 7k, 9l.

Mucuna pruriens, *DC.* At Kota, Wray 3326; an annual climber, pantropic: in Peninsula 3e only.

Erythrina lithosperma, *Miq.* 1800-3800', Curt. 2982, B. & H.; fr. Feb., Oct. A tree of Indo-Malaya to Philippines; in Peninsula only doubtfully wild.

Milletia albiflora, *Prain.* 100-300', Wray 1864, Kunstl. 6842; fr. May, fruit Nov. A tree up to 50', endemic, 2d, 6e, 3f, 4f, 5h, 6k.

Milletia sericea, *Benth.* Larut, Kunstl., fide Ridl. A liane of W. Malaysia; in Peninsula 2d, 4f, 5g, 5h, 6k, 9k.

Milletia unifoliata, *Prain.* At Tupai, Wray 2836; fruit Aug. A tree up to 30', endemic, 3f, 4f.

Padebruggea dasyphylla, *Miq.* At 200', Wray, fide Ridl. A liane of Java; in Peninsula 3e only.

Dalbergia phyllanthoides, *Bl.* 500-1000', Wray 2083, Kunstl. 4978, 5182; fr. Oct., fruit Nov. A climber of Java and Borneo; in Peninsula 2d.

Dalbergia tamarindifolia, *Roxb.* At 100', Kunstl. 6481; fr. Aug. A climber or tree of Indo-Malaya to the Philippines, and China; in Peninsula 1b, 2b, 2c, 2d, 6e, 4f.

Pterocarpus indicus, *Willd.* A tree up to about 80', of Tenasserim to the Philippines; in Peninsula commonly planted as a roadside tree, and probably wild in 2d, 5h, 6k.

Pongamia glabra, *Vent.* At Taiping, Hend. 10231; fr. Nov. A tree up to 60', of Indo-Australia and Mascarene Is.; in Peninsula common near the sea.

Derris elegans, *Benth.* 100-500', Kunstl. 3911, 5583; fr. Feb. A climber, widely Malaysian; in Peninsula 5h, 6k.

Derris elliptica, *Benth.* The Tuba plant, cultivated. Wray 1678. A sprawler of Siam to Borneo, only doubtfully wild in 2b, 2d.

Derris malaccensis, *Prain*, var. *aptera*. 300-800', Kunstl. 6428; fruit Aug. A climber of Siam to Borneo; in Peninsula 2d, 4f, 6f, 5g, 9k, the var. only in 3e.

Kunstleria Kingii, *Prain*. 500-1500', Kunstl. 3830, 6870, 6935; fr. Nov., Dec., fruit Jan. A liane, endemic and local.

Desmodium capitatum, *DC.* At Taiping, Scott., fide Ridl. A creeping shrublet of S. E. Asia; in Peninsula 2b, 3f, 6f, 7g, 5h.

Desmodium heterophyllum, *DC.* At 100', Kunstl. 2579; fr. Nov. A small herb, of S. E. Asia; in Peninsula 5b, 2d, 8e, 5g, 8h, 6k, 9m.

Desmodium polycarpum, *DC.* Up to 300', Kunstl. 4984, Ridl., Hend. 10164; fr. April, Oct., fruit Oct. A shrublet of Africa and Indo-Australia; in Peninsula common.

Desmodium virgatum, *Zoll.* At Batu Kurau, Scott., fide Ridl. A small shrub of Burma, Java, Philippines; in Peninsula 3e only.

Ormosia gracilis, *Prain*. At about 3000', Wray 2979. A tree up to 40', endemic, 5g.

Ormosia scandens, *Prain*. 300-500', Kunstl., fide Ridl. A liane, endemic and local.

Cassia alata, *Linn.* At 300', Hend. 10068; fr. and fruit Jan. A large shrub, pantropic, of S. American origin; in Peninsula common.

Cassia javanica, *Linn.* At Taiping, Wray 2020; fr. March. A tree of W. Malaysia; in Peninsula cultivated only.

Koompassia malaccensis, *Benth.* At Taiping, Wray, Kunstl., fide Ridl. A tree up to 150', of Sumatra; in Peninsula 2d, 3f, 7g, 6k, 9m.

Dialium patens, *Baker.* At 100', Kunstl. 5577; fr. Feb. A tree up to 80', of Borneo; in Peninsula 8g, 6k.

Bauhinia bidentata, *Jack.* 300-500', Kunstl. 3183; fr. Aug. A liane or shrub of Singapore; in Peninsula, Penang to Johore.

Bauhinia cornifolia, *Baker.* 3000-4300', Kunstl. 6261, B. & H.; fr. July. A liane, endemic, 2d, 6d, 5g, 6g, 5h, 5j.

Bauhinia ferruginea, *Rorb.* 300-500', Kunstl. 2308; fruit Nov. A shrub (Kunstl.) or liane (Ridl.), endemic, 2d, 4f, 5h.

Bauhinia Findlaysoniana, *Grah.* Larut, Scort. 1463. A liane of Siam and Borneo; in Peninsula 2d.

Bauhinia flammifera, *Ridl.* At Taiping, Scort. We are of opinion that at least one sheet placed by Mr. Ridley under *B. integrifolia*, Roxb. is his *B. flammifera*. The only other sheet seen by us that Mr. Ridley quotes in his Flora is his own from Temengoh (the type of *B. holosericea*, Ridl.): this differs. Assuming that the type of *B. integrifolia*, Roxb. agrees with the latter, then the Taiping plant is *B. flammifera*, which is very common through the Peninsula, extending to Lower Siam.

Bauhinia glauca, *Wall.* At Kota, Wray, Scort., fide Ridl. A small climber of China and W. Malaysia; in Peninsula 2d, 5f, 6f.

Bauhinia lucida, *Wall.* 300-500', Kunstl. 3434; fr. Oct. A liane, endemic, 2d.

Bauhinia mollissima, *Wall.* 300-800', Kunstl. 5165; fr. Nov. An erect or climbing shrub of Tenasserim; in Peninsula 2b, 2d.

Bauhinia Wrayi, *Prain.* At Taiping, Wray 1934; fr. May. A small climber, endemic, 5g, 8l.

Saraca bijuga, *Prain.* At 500', Kunstl. 4059; fruit March. A small tree, endemic, 4d, 4f, 6k.

Saraca declinata, *Miq.* 300-3000', Kunstl. 2729, 3691; fr. Jan. A tree up to 20', of Java; in Peninsula 4d, 6f, 5h, 6k.

Saraca macroptera, *Miq.* Larut, Kunstl., fide Ridl. A tree up to 40', of Sumatra and Borneo; in Peninsula 3c only.

Saraca palembanica, *Miq.* At 100', Kunstl. 6372; fr. July. A tree up to 40', of Sumatra; in Peninsula 2d, 3f.

Saraca taipingensis, *Cantley.* Taiping Hills, Cantley, Anders. 99; fr. March. A small tree, endemic, 4f, 5g, 6g, 5h, 6j, 6k.

Saraca triandra, *Baker.* 300-2000', Kunstl. 3797, 4507, 8516, Ridl. 14678; fr. Aug., fruit Jan. A shrub or tree of Sumatra and Borneo; in Peninsula common from Kedah to Malacca.

Crudia Curtisii, *Prain.* At Taiping, Kunstl., fide Ridl. A tree up to 150', endemic, 2d, 4f, 5h, 8j, 6k.

Crudia gracilis, *Prain.* At Taiping, Kunstl., fide Ridl. A shrub, endemic and local.

Mezoneuron sumatranum, *Wight and Arn.* At Taiping, Scort., fide Ridl. A prickly climber of Sumatra, Borneo and Philippines; in Peninsula 2d, 3f, 4f, 5h, 6k, 9m.

Caesalpinia parviflora, *Pruin.* Larut, Kunstl., fide Ridl. A small tree or climber, endemic and local.

Parkia speciosa, *Hassk.* 100-2000', Wray, Kunstl. 5300; fr. Dec. A tree up to 80', of Sumatra and Java; in Peninsula 2d, 5h, 6k, 9m.

Adenanthera bicolor, *Moon.* At Ulu Sapetang, Forest Dept. 233. A tree up to 80', of Ceylon; in Peninsula 2d, 5h, 6k, 9m.

Entada Schefferi, *Ridl.* At 100', Kunstl. 6228; fruit June. A liane of Lower Siam and Java; in Peninsula common.

Mimosa pudica, *Lin.* The sensitive plant. Common everywhere in waste ground. Distrib: pantropic, of S. American origin.

Acacia pennata, *Willd.* 300-800', Kunstl. 5504. A climber of Trop. Africa and Asia; in Peninsula 2b, 2d, 8g, 5h, 6j, 6k.

Pithecolobium affine, *Baker.* 300-500', Kunstl. 3406; fr. March. A small tree of Burma and Borneo; in Peninsula 3f, 5h, 6k, 9m.

Pithecolobium contortum, *Benth.* 500-800', Wray 2636, 4249, Kunstl. 6869; fr. Nov. A small tree, endemic, 2c, 2d, 3f, 4f, 5h, 7l, 9m.

Pithecolobium Clypearia, *Benth.* At Taiping, Scort. 481. A small tree of Malaysia and S. China; in Peninsula 2d, 8d, 4f, 5h, 8h, 6k, 9m.

Pithecolobium ellipticum, *Hassk.* 200-300', Wray 2666, Hend. 10043, 10305; fr. Aug., fruit Jan. A small tree of W. Malaysia to the Philippines; in Peninsula 2c, 3d, 3f, 4f, 6k, 9k, 9m.

Pithecolobium lobatum, *Benth.* At 200', Hend.; fruit Jan., Feb. A tree up to 80', of Malaysia; in Peninsula common.

ROSACEAE.

Parinarium asperulum, *Miq.* 500-1500', Kunstl. 3537, 7568; fr. April, fruit Oct. A tree up to 80', of Sumatra; in Peninsula 2d, 6e, 8g, 9m.

Parinarium elatum, *King.* 500-1000', Kunstl. 3436, 3711; fr. Oct., fruit Jan. A tree up to 130', endemic and local.

Parinarium Kunstleri, *King.* 300-800', Kunstl. 3715, 6917; fruit Dec., Jan. A tree up to 80', endemic and local.

Pygeum parviflorum, *Teys. and Binn.* 300-3000', Kunstl. 3791, 6896 (var. *densa*), 7236; fr. Dec., Jan., fruit Feb. A tree up to 60', of Java and Borneo; in Peninsula 2d, 4d, 4f, 5h, 6k.

Rubus elongatus, *Smith.* 300-800', Wray 1849, Ridl. A bramble of W. Malaysia; in Peninsula 5h.

Rubus glomeratus, *Bl.* 3500-4500', Fox 167, Hervey, Anders. 54, B. & H. 12609, 12778; flr. March, Oct. A bramble of W. Malaysia; in Peninsula 1b, 2d, 5g, 5h, 6j, 9m.

Rubus rosaefolius, *Smith.* 4000-4500', Wray 4187, Ridl. 5233; flr. and fruit June. A bramble of Africa, Indo-Australia, Japan; in Peninsula 2d, 4e, 4f, 5g, 5h.

Pyrus granulosa, *Bertol.* At 4400', Fox 153; fruit Oct. A tree up to 100', of India to Sumatra; in Peninsula 6e, 4f, 5g.

SAXIFRAGACEAE.

Dichroa febrifuga, *Lour.* 2000-3900', all collectors; flr. Feb., March, Dec., fruit March. A shrub of Indo-Malaya and S. China; in Peninsula 4f, 5h.

Weinmannia Blumei, *Planch.* 3800-4750', Ridl. 3027, B. & H. 12892; flr. March, fruit Feb. A small tree of Java and ?Borneo; in Peninsula 6e, 5g, 6g, 8g, 7k.

Polyosma conocarpa, *Ridl.* 2500-3800', Wray. B. & H. 12947; fruit March. A small tree of Sumatra; in Peninsula 1b, 2d, 8g, 8j, 6k, 9m.

Polyosma grandis, *Ridl.* 3500-4000', Kunstl. 3802; flr. Jan. A tree up to 50', endemic and local.

LEGNOTIDACEAE.

Gynotroches axillaris, *Bl.* 300-800', Wray 2501, Kunstl. 5245; flr. Dec. A small tree of W. Malaysia and the Philippines; in Peninsula common.

Pellacalyx axillaris, *Korth.* 200-300', Kunstl. 3627, Hend. 10173; flr. Dec., fruit June. A shrub or small tree of Sumatra and the Philippines; in Peninsula 2d, 8g, 5h, 6k, 9l, 9m.

Pellacalyx Saccardianus, *Scort.* At Taiping, Wray 701, Ridl. 3020; flr. Dec. A tree of Borneo; in Peninsula 2d, 4f, 8g, 5h, 5j, 9m.

ANISOPHYLLAEACEAE.

Anisophyllaea apetala, *Scort.* 2000-2500', H. & N. 2391, B. & H. 12829; flr. March, fruit Feb. A small tree, endemic, 3f, 5h, 6k.

Anisophyllaea Curtisii, *King.* At 2500', H. & N. 2378; flr. Feb. A small tree, endemic, 2d.

Anisophyllaea disticha, *Baill.* 300-2500', Wray 17, Curt. 3721; fruit Oct., Dec. A shrub of W. Malaysia; in Peninsula 2c, 2d, 8g, 8j, 8l, 9l, 9m.

Anisophyllaea Gaudichaudiana, *Buill.* 1500-2000', Wray 2214, Kunstl. 2731, Ridl. 3028; fr. Jan., fruit June. A tree up to 50', endemic, 2d.

COMBRETACEAE.

Terminalia citrina, *Rorb.* 300-500', Wray 3173; fr. Aug. A tree or climber of S. India; in Peninsula 2d, 6f, 5h, 6j.

Combretum nigrescens, *King.* Larut, Kunstl., fide Ridl., Forest Dept. 164 (var. *Kunstleri*). A climber, endemic, the species at 6e, 5h, 6j, the var. at 6g.

Combretum sundaicum, *Miq.* At Taiping, Wray 4272, Haniff 1258; fr. May. A woody climber of W. Malaysia and the Philippines; in Peninsula common.

MYRTACEAE.

Rhodamnia cinerea, *Sack.* 300-1000', Wray 2325, Kunstl. 6813, H. & N. 2397; fr. Feb., Nov. A small tree of Siam to Australia; in Peninsula common.

Rhodomyrtus tomentosa, *Wight.* 200-500', Kunstl. 8410; fr. Jan. A shrub of Indo-Malaya to Japan; in Peninsula common.

Eugenia Benjamina, *King.* Up to 2500', Wray 2623, 2797, 3204; A shrub of Sumatra; in Peninsula 3e only.

Eugenia caudata, *King.* 1800-4700', Kunstl. 4241, 6262, Curt. 2007, B. & H. 12768; fr. March, May, fruit July. Sept. A tree up to 40', endemic, 2d, 5h, 6j, 6k, 7k.

Eugenia chlorantha, *Duthie.* 300-1000', Kunstl. 4082, 4220; fr. April, fruit May. A tree up to 50', of Sumatra and Borneo; in Peninsula 2d, 5h, 6k, 9m.

Eugenia chloroleuca, *King.* 1500-2000', Wray 2917, Kunstl. 4951, 7307, Ridl. 11920; fr. Sept., fruit Feb. A tree up to 40', endemic, 6k, 9m.

Eugenia Clarkeana, *King.* 300-500', Kunstl. 6822; fruit Nov. A small tree, endemic, 6f, 5h, 8j.

Eugenia corrugata, *King.* 3000-4000', Kunstl. 5298; fruit Dec. A tree up to 40', endemic, 5g.

Eugenia cymosa, *Lam.* At 300', Kunstl. 3422; fr. Oct. A small tree of Indo-Malaya; in Peninsula 1b, 2d, 3f, 6k, 9m.

Eugenia Duthieana, *King.* 500-4300', Kunstl. 3966, 4218, B. & H. 12759; fr. March, fruit May. A tree up to 50', endemic, 2c, 2d, 5h, 8h, 6k, 9m.

Eugenia Dyeriana, *King.* 100-500', Kunstl. 6196, 6767; fr. June, fruit Oct. A tree up to 70', endemic and local.

Eugenia expansa, *Duthie.* 100-2500', Wray 3199, Kunstl. 5483; fr. Jan. A shrub or tree, endemic, 2d, 4f, 5h, 6k, 9m.

Eugenia filiformis, Wall. 100-2500', Kunstl. 6708, Ridl. 2991; fr. Feb., Oct. A spreading tree, endemic, Penang to Singapore.

Eugenia Gageana, King. At 100', Kunstl. 7563; fr. May. A tree up to 50', endemic and local.

Eugenia garcinifolia, King. 300-500', Kunstl. 6974; fr. Dec. A tree up to 80', of Sumatra; in Peninsula 4f.

Eugenia grata, Wight. At 100', Kunstl. 5414, 5433; fr. Jan. A shrub or small tree of Indo-Malaya; in Peninsula 1b, 2d, 3f, 7l, 2d, 3f, 7l.

Eugenia Hoseana, King. 300-500', Wray 2952, Kunstl. 3407; fr. Sept. A tree up to 40', endemic, 9l.

Eugenia Hullettiana, King. 500-800', Kunstl. 7470; fr. April. A small tree of Sumatra; in Peninsula 3e only.

Eugenia inophylla, Roxb. Larut, Kunstl., fide Ridl. A tree up to 50', endemic, 1a, 1b, 2d, 4f, 8h.

Eugenia Koordersiana, King. 500-1000', Kunstl. 6233; fr. June. A tree up to 80', endemic?, local.

Eugenia Kunstleri, King. Up to 800', Kunstl. 3310; fr. Sept. A tall tree, endemic, 2d.

Eugenia lineata, Duthie. 300-500', Wray 1973, Kunstl. 4086, Haniff 13121; fr. March, April. A tree up to 60', of W. Malaysia; in Peninsula common.

Eugenia mollis, King. At 100', Kunstl. 8387; fr. Jan. A shrub, endemic and local.

Eugenia myrtifolia, Roxb. At 100', Wray 2703, Kunstl. 8379; fr. Jan., Aug. A bushy tree of Indo-Malaya; in Peninsula 8g, 8h, 7l, 9l, 9m.

Eugenia nigricans, King. At 1000', Wray, fide Ridl. A tall tree, endemic and local.

Eugenia pachyphylla, Kurz. At 2000', Curt., fide Ridl. A tree of Burma; in Peninsula 6k.

Eugenia papillosa, Duthie. 100-400', Kunstl. 2813; fr. Feb. A lofty tree, endemic, 5h, 6k, 9m.

Eugenia penangiana, Duthie. 1000-1500', Kunstl. 6965; fruit Dec. A tree up to 80', endemic, 2d, 5h, 6k.

Eugenia perakensis, King. At 100', Kunstl. 5595; fr. Feb. A tree up to 70', endemic, 3f, 4f.

Eugenia polita, King. Larut, Kunstl., fide Ridl. A shrub or small tree, endemic, 3f, 6k, 9k.

Eugenia polyantha, *Wight*. 200-3000', Wray 2587, 2958, Kunstl. 6614; fr. Sept. A tree up to 70', of Indo-Malaya; in Peninsula 2h, 2d, 4f, 6f, 6g, 5h, 6k, 9m.

Eugenia Prainiana, *King*. 100-1000', Kunstl. 3526 (var. *Pearsoniana*), 5309, 6584; fr. Oct., fruit Sept., Dec. A tree up to 80', endemic and local.

Eugenia pseudo-formosa, *King*. 3000-4000', Kunstl. 6254, fr. July. A small tree of Sumatra; in Peninsula 1b, 2d, 5h, 9m.

Eugenia punctulata, *King*. 300-2000', Kunstl. 6611, 6937; fr. Sept., fruit Dec. A tree up to 50', of Borneo; in Peninsula 5g, 7g, 8g, 5h, 6k, 9m.

Eugenia pustulata, *Duthie*. 300-800', Kunstl. 6758, 7536; fr. April. A small tree, endemic, 6c, 2d, 6k, 9m.

Eugenia quadrata, *King*. At 100', Kunstl. 5547; fr. Feb. A small tree, endemic and local.

Eugenia setosa, *King*. 100-300', Kunstl. 5266, 6202; fr. June. Dec. A shrub or climber, endemic and local.

Eugenia subdecussata, *Duthie*. 300-500', Kunstl. 3752; fruit Jan. A shrub or small tree, endemic, Kedah to Singapore.

Eugenia subhorizontalis, *King*. At Taiping, Wray 2118; fr. June. A small tree of Sumatra; in Peninsula 3e only.

Eugenia tecta, *King*. Up to 500', Kunstl. 1863; fr. June. A small tree, endemic and local.

Eugenia Thumra, *Roxb.*, var. *penangiana*, *King*. At 4000', B. & H. 12860; fr. Feb. A tree of Burma (the species); in Peninsula the var. at 2d, 23f.

Eugenia valdevenosa, *Duthie*. 300-4100', Scott. 315, Kunstl. 2737, 5122, Ridl. 5347, H. & N. 2467; fr. Feb., June, fruit Jan., March. A tree up to 20', endemic, 2d, 5g, 5h, 6k, 9l.

Eugenia variolosa, *King*. 300-800', Kunstl. 2796, 3995; fr. March, Oct. A small tree, endemic, 4f, 4g, 5h, 7j, 8l, 9l, 9m.

Eugenia zeylanica, *Wight*. 300-500', Kunstl. 5904; fr. April. A bushy tree of Indo-Malaya; in Peninsula common.

Barringtonia macrostachya, *Kurz*. 500-800', Kunstl. 3779; fruit Jan. A shrub or tree of Burma and Borneo; in Peninsula 1h, 2h, 2c, 6k, 0k, 9m.

Barringtonia pauciflora, *King*. 1500-2000', Kunstl. 6355; fr. July. A tree up to 40', endemic and local.

Barringtonia Scortechinii, *King*. 4000-4300', Hervey 300, B. & H. 12762; fruit March. A tree up to 60', endemic, 2d, 5g, 5h, 6k.

Barringtonia sumatrana, *Miq.* ? H. & N. 2468 (determination doubtful). A tree of W. Malaysia; in Peninsula 2d, 7g, 9k, 9l, 9m.

MELASTOMATACEAE.

Osbeckia perakensis, *Ridl.* G. Hijau, Mrs. Bland. A shrub, endemic and local.

Melastoma imbricatum, *Wall.* 2000-4000', *Curt.*, *Ridl.* 2934; fr. May, Sept. A large shrub of Indo-China and Sumatra; in Peninsula 2d, 3f, 6g, 5h.

Melastoma malabathricum, *Linn.* 100-4300', *Ridl.*, *Hend.* 10013, *Hamiff* 13104, *B. & H.* 12622; fr. Jan., March. A shrub of Indo-Australia and the Mascarene Is.; in Peninsula common in the North.

Melastoma perakense, *Ridl.* 1000-4700', all collectors; fr. Jan., Feb., June, July. A shrub of Lingga and Java; in Peninsula 4f, 5g, 8g, 5h, 7l.

Melastoma sp. 2000-4300', *Ridl.* 2935, *Anders.* 1, *B. & H.* 12580; fr. March. A shrub up to 12'. Near *M. molle*.

Oxyspora floribunda, *Ridl.* 3000-4500', *Ridl.* 2940, 5342, *B. & H.* 12946; fr. March, June. A large shrub, endemic and local.

Oxyspora stellulata, *King.* *Anders.* 70; fr. March. A large shrub or tree of Sumatra; in Peninsula 6d, 4e, 4f, 5g.

Allomorpha alata, *Scort.* 200-3000', *Kunstl.* 2047, *Curt.* 3719, *Ridl.* 11435, *Hend.* 10057; fr. all the year. A small shrub, endemic, 6e, 6d, 6e, 4f, 5h.

Allomorpha exigua, *Bl.* At Waterloo, *Ridl.* 2946 (var. *capillaris*); fruit March. A small shrub, endemic, 4d, 3f, 9k, the var. at 4d, 3f.

Blastus Cogniauxii, *Stapf.* 4000-4500', *Wray* 2984, *Curt.*, *Ridl.* 2947, *Anders.* 10, *B. & H.* 12618, 12859; fr. Feb., March. A shrub of Borneo; in Peninsula 4d, 6d, 6e, 4f, 6f, 5g, 5h, 9k, 9l.

Phaulanthus Curtisii, *Ridl.* 100-4000', *Curt.* 2014, 2986, 3715, *Ridl.* 14688, *Hend.* 10452; fr. Feb., Aug.-Dec. A small shrub, endemic, 2d, 4d, 4e.

Campimia Wrayi, *Ridl.* 2000-4000', *Curt.* 2008, *Ridl.* 2948, 5197; fr. Feb., June, Sept., fruit June, Sept. A small shrub, endemic and local.

Sonerila begoniaefolia, *Bl.* 4000-4500', *Ridl.*, *Hervey.* A herb of W. Malaysia; in Peninsula, Penang to Singapore.

Sonerila brachyantha, *Stapf.* At 4000', *Ridl.* 2945; fr. and fruit March. A small herb, endemic, 4e, 6e, 3f, 4f, 5h.

Sonerila bracteata, *Stapf.* 3200-4700', *Scort.* 12a, *Kunstl.* 2133, *Anders.* 35, *B. & H.* 12853; fr. Feb., March, July, fruit March, July, Oct. An erect herb, endemic, 5g, 5h, 8k.

Sonerila erecta, *Jack.* 300-4750', all collectors; fr. Feb., March, Sept., fruit Feb., March. A herb, endemic, 2d, 4f, 5g, 9k.

Sonerila glabriflora, *Stapf.* At 100', *Kunstl.* 1953, 2128; fr. and fruit June, July. A small herb, endemic, 4f.

Sonerila heterostemon, *Naud.* 200-2500', *Ridl.* 11436, *Hend.* 10027, 10180; fr. and fruit June, Dec. A small herb of Sumatra and Borneo; in Peninsula Taiping to Singapore.

Sonerila integrifolia, *Stapf and King.* 1800-4500', *Kunstl.* 2004, 2161, *Fox, Ridl.* 2943, *B. & H.* 12747, 13011; fr. March, fruit Aug., Oct. An erect herb, endemic, 5g, 5h.

Sonerila nidularia, *Stapf.* 300-1000', *Curt., Hend.* 10193, 10427, 10448; fr. Feb., May, June, Oct., fruit June. A small herb, endemic, 3f, 6g.

Sonerila picta, *Korth*, var. *concolor*, *Ridl.* 2000-3000', *Curt.* 3720; fruit Dec. A succulent herb of W. Malaysia; in Peninsula the var. at 6e, 4f, 5g, 6g, 5h, 7k.

Sonerila repens, *Stapf.* 2000-4000', all collectors; fr. Feb., March, Dec., fruit Feb., July, Dec. A fleshy herb, endemic, 4f.

Sonerila succulenta, *Stapf.* At 3000', *Ridl.* 2942; fr. and fruit Feb. A succulent herb, endemic and local.

Phyllagathis Griffithii, *King.* 500-3000', *Curt.* 2012, *Haniff* 13130, *B. & H.*; fr. March, Sept. A creeping herb, endemic, 4f, 5h, 5j, 6k.

Phyllagathis hispida, *King.* 4500-4700', *Fox, Anders.* 23, *B. & H.* 12880; fr. Feb., March, Oct. A woody herb, endemic, 5c, 3d, 6e, 4f, 5g, 9k.

Phyllagathis rotundifolia, *Bl.* 200-4500', *Kunstl.* 2728, *Curt.* 2013, *Ridl.* 2936, *Hend.* 10437; fr. Jan.-March, Sept., fruit Jan., Feb. A creeping herb of Sumatra; in Peninsula common.

Marumia nemorosa, *Bl.* 4000-4300', *Ridl., B. & H.* 12599; fr. March. A climber of Tenasserim, Sumatra and Borneo; in Peninsula common.

Dissochaeta annulata, *Hook. fil.* At 2500', *Ridl.*; fr. June. A climber of Borneo; in Peninsula 2d, 7k, 9k, 9l, 9m.

Dissochaeta anomala, *King.* ?Larut, *Kunstl., fide Ridl.* A climber, endemic, 6d. Possibly *Kunstler's* Ulu Bubong specimens are what *Ridley* means here, as he does not quote them in his *Flora*.

Dissochaeta celebica, *Bl.* 100-500', *Kunstl.* 2468, *Curt.* 2725; fr. May, fruit May, Oct. A slender climber of Bangka to the Philippines; in Peninsula common.

Dissochaeta gracilis, *Bl.* Up to 3200', *Curt., Anders.* 5, *Haniff* 13267, *B. & H.* 12784; fr. March, May, Dec., fruit March, Dec. A slender climber of W. Malaysia; in Peninsula 4d, 6d, 4e, 4f, 5g, 6g, 5h, 7l, 9m.

Dissochaeta intermedia, *Bl.* At 4500', Fox 178; flr. Oct. A slender climber of Java; in Peninsula 2d, 6g, 5h, 7l, 9m.

Dissochaeta pallida, *Bl.* 1000-4500', Kunstl. 8499, Fox 178, Ridl. 5241, B. & H. 12941; flr. Feb., June, Oct., fruit March, June. A climber of W. Malaysia; in Peninsula 5c, 2d, 3f, 4f, 6g, 4h, 5h, 9m.

Anplectrum divaricatum, *Triana*. 100-2000', Curt. 2009, Ridl.; flr. Sept. A climber of W. Malaysia; in Peninsula 2d, 5g, 5h, 5j, 6j, 6k.

Anplectrum glaucum, *Triana*. 300-400', Curt.; flr. Oct. A climber of W. Malaysia; in Peninsula 2d, 4d, 6j, 6k, 7k.

Anplectrum pallens, *Bl.* var. *petiolare*, *Ridl.* 100-2000', Derry, Curt., Ridl. 11444, H. & N. 2302; flr. Sept., fruit Jan., Feb., Nov., Dec. A slender climber of Sumatra and Borneo; in Peninsula, the species at 2d, the var. common.

Medinilla Clarkei, *King*. At Maxwell's Hill, Burkill, (abnormal leaf only). An epiphyte of Sumatra; in Peninsula 4d, 4c, 4f, 5g, 5h, 7k, 9k.

Medinilla crassinervia, *Bl.* At 300', Wray 1821. An epiphyte of Borneo to N. Guinea; in Peninsula 2d, 6e, 4f, 5g, 6k, 9m.

Medinilla Hasseltii, *Bl.* 500-3000', Kunstl. 1961, 8507, Curt. 2715, 3448, Ridl.; flr. Feb., June, Dec., fruit May. A small epiphyte of W. Malaysia; in Peninsula 4d to 9m.

Medinilla heteranthera, *King*. 3000-4500', Kunstl. 3644, Ridl. 5346, Derry, B. & H. 12952; flr. June, fruit March. An epiphyte, endemic, 4f, 5g.

Medinilla scandens, *King*. 200-2000', Ridl. 2933, Hend. 10393; flr. Jan, Nov., fruit Nov. A creeper on trees, endemic, 4f.

Medinilla Scortechinii, *King*. 4000-4500', Wray 1739, Curt., Anders. 16, Derry; flr. March, Oct., fruit March. An epiphyte, endemic, 4f, 5g, 5h.

Medinilla speciosa, *Bl.* Up to 3000', Wray 3218, Curt. 2011, Derry; flr. Sept., fruit Oct. A large shrub of W. Malaysia; in Peninsula 2d, 4f, 5g.

Medinilla venusta, *King*. Taiping Hills, Kunstl., fide Ridl. (the species). At 3500', Ridl., B. & H. 12928 (var. *chionantha*); flr. Feb., March. An epiphyte, endemic, 4f, 5g.

Pogonanthera pulverulenta, *Bl.* Larut Hill, Derry. A shrub of W. Malaysia; in Peninsula 6b, 2d, 3f, 8h, 9j, 6k, 9m.

Astronia smilacifolia, *Triana*. 1800-2000', Kunstl. 2027, Ridl. 11921; flr. Feb., fruit July. A small bushy tree of Borneo; in Peninsula 2d, 4e.

Pternandra capitellata, *Jack.* At 600', Hend. 10087; flr. Jan. A bushy tree of Tenasserim; in Peninsula 2d, 3f.

Pternandra coerulescens, *Jack.* At Taiping, Ridl. 14686; fruit Aug. A small tree of W. Malaysia; in Peninsula common in low country in the West.

Pternandra echinata, *Jack.* var. *pubescens*, *King.* 300-500', Wray 2354, Kunsth. 3518; fruit Oct. A bushy tree of W. Malaysia; in Peninsula the species common, the var. at 6c, 2d, 5h, 6k.

Memecylon acuminatum, *Sm.* 300-800', Kunsth. 3458; fruit Oct. A tree, endemic, 2d, 5g, 9j, 6k, 7k, 8k, 8l, 9m.

Memecylon amplexicaule, *Roxb.* 200-1800', Wray 1964, 2326, 3278, Kunsth. 3058, Curt. 1294, Ridl. 14687; flr. Aug., Dec., fruit June. A small tree, endemic, Penang to Singapore.

Memecylon caloneuron, *Miq.* 800-1000', Kunsth., fide Ridl. Wray 3235. A tree of W. Malaysia; in Peninsula 1b, 3f, 9l.

Memecylon Curtisii, *Burkill and Henderson*, nom. nov. *M. gracilipes*, *Ridl.* At Waterloo, 1000', Curt., fide Ridl. A small tree, endemic and local. Ridley's name is preoccupied by *M. gracilipes*. C. B. Rob. (1911), a Philippine plant.

Memecylon dichotomum, *Clarke.* 1000-4000', Wray 2989, Kunsth. 5036, 5297, Curt. 1295, Ridl. 2938; fruit Oct., Dec. A slender shrub, endemic, 2c, 6e, 6f, 5g, 6g, 5h, 5j, 7j, 6k.

Memecylon epiphyticum, *King.* 800-2500', Kunsth. 5184, Ridl.; flr. June, fruit Nov. An epiphytic shrub, endemic and local.

Memecylon floridum, *Ridl.* 500-1000', Kunsth., fide Ridl. A tree up to 50', endemic and local.

Memecylon fruticosum, *King.* 200-500', Kunsth. 2971, 3635; flr. April, Aug. A shrub, endemic, 5g, 5h.

Memecylon garcinioides, *Bl.* At 3000', Wray 2961, 3203; flr. Aug. A small tree of W. Malaysia; in Peninsula common.

Memecylon heteropleurum, *Bl.* 500-800', Kunsth. 6621. A shrub or small tree of Sumatra and Borneo; in Peninsula 4f, 6f, 6g, 5h, 6k, 9m.

Memecylon Kunstleri, *King.* At Changkat Serdang, Wray, fide Ridl. A tree, endemic, 4f, 5h.

Memecylon laevigatum, *Bl.* 500-2500', Kunsth. 3763, Ridl.; flr. Jan., June. A shrub or small tree of Indo-Malaya; in Peninsula 5g, 5h, 6k, 9l, 9m.

Memecylon minutiflorum, *Miq.* 2500-3000', Wray 3240, Kunsth. 6265; fruit July. A tree of Sumatra; in Peninsula common.

Memecylon myrsinioides, *Bl.* 300-800', Wray 2258, Kunstl. 3517; fruit Oct. A shrub or small tree of W. Malaysia; in Peninsula common.

Memecylon oligoneuron, *Bl.* Larut Hills, Kunstl., fide Ridl. A small tree of Java, Borneo and the Philippines; in Peninsula 2d, 4f, 5f, 0j, 6k.

Memecylon Wallichii, *Ridl.* Kunstl. (Larut), Curt. (Waterloo), fide Ridl. A shrub or small tree, endemic, 2d.

LYTHRACEAE.

Crypteronia Griffithii, *Clarke.* 800-1500', Wray 2638, 2589, Kunstl. 4152; flr. April. A tree, endemic, 2d, 6f, 5h, 6k.

Duabanga sonneratoides, *Hum.* At Waterloo, Curt.; flr. May. A lofty tree of Himalaya to China; in Peninsula 1a, 2d, 4f, 6f, 5g, 5h, 6k.

SAMYDACEAE.

Casearia Clarkei, *King*, var. *Kunstleri*, *Ridl.* 800-1000', Kunstl. 6936; fruit Dec. A tree up to 80', endemic, the species Penang to Singapore, the var. at 4e, 4f, 9k.

Casearia coriacea, *Vent.* At 4300', B. & H. 12871; fruit Feb. A small tree of Java and Borneo; in Peninsula 4f, 9m.

Casearia Lobbiana, *King.* 800-1800', Wray 2594, Kunstl. 2631, Curt.; flr. Jan., fruit July, Sept. A shrub or small tree of Lower Siam; in Peninsula 2d, 5h, 6k, 8l, 9m.

Homalium propinquum, *Clarke.* 800-1500', Kunstl. 4883; flr. Sept. A tree up to 100', endemic, 2d, 4g.

PASSIFLORACEAE.

Passiflora foetida, *Linn.* At 200', Hend. 10067; flr. and fruit Jan. A climber, pantropic, of S. American origin; in Peninsula common in waste ground.

Passiflora Horsfieldii, *Bl.* At 500', Haniff 13135; flr. March. A slender climber of Java; in Peninsula 4f, 6f.

Adenia acuminata, *King.* 600-3000', Wray 1745, Hend. 10422; fruit Oct. A slender climber of Sumatra and Java; in Peninsula, Taiping to Malacca.

Adenia nicobarica, *King.* At 3000', Ridl., H. & N. 2352, Hend. 10120; fruit Jan., Feb., Dec. A slender climber of Tenasserim and Lower Siam; in Peninsula 1a, 1b, 2d, 3f, 6f, 5h, 8k.

CUCURBITACEAE.

Hodgsonia capniocarpa, *Ridl.* 100-500', Kunstl. 4021; flr. March. A wide climber of Indo-Malaya; in Peninsula 2d, 6g, 7g, 6k.

Trichosanthes celebica, *Cogn.* At 500', Kunstl. 4033; fruit March. A slender climber of Celebes; in Peninsula 3f, 6f, 6k, 7l, 9m.

Trichosanthes tricuspidata, *Lour.* 200-500', Kunstl. 5111; fruit Nov. A slender climber of Indo-China, Siam, Java Borneo; in Peninsula 2d, 4e, 7g.

Trichosanthes Wawraei, *Cogn.* 1000-2500', Kunstl. 2203, 5280; fruit Dec. A slender climber, endemic, 2d, 4f, 8g, 6k, 8l, 9m.

Gymnopetalum integrifolium, *Kurz.* At 300', Wray. fide Ridl. A creeping herb of Indo-China and Java; in Peninsula 6d, 3f.

Momordica Clarkeana, *King.* At 300', Wray 3273. A climber, endemic and local.

Melothria affinis, *King.* 100-1500', Kunstl. 2539, Curt.; fruit May, Nov. A climbing herb of Borneo; in Peninsula 6d, 4e, 3f, 5g, 5h, 8h, 6k, 7l.

BEGONIACEAE.

Begonia hirtella, *Link.* 3400-3800', B. & H. 12811, 12997; fr. March. A herb, native of S. America, occurring here as an escape.

Begonia Maxwelliana, *King.* 2300-4300', B. & H. 12569, 12755, 12803; fr. March. A herb, endemic, 2d, 4f.

Begonia taipingensis, *King.* Taiping, Wray, Scort., Kunstl., fide Ridl. A long creeping herb, endemic, 5g, 5h.

UMBELLIFERAE.

Hydrocotyle asiatica, *Linn.* At 4750', B. & H. A herb of the tropics and sub-tropics of the Old World; in Peninsula common.

Hydrocotyle javanica, *Thunb.* 3700-4000', Curt. 2086, B. & H. 12912; fruit Sept. A creeping herb of Indo-Australia, China, Japan; in Peninsula 4d, 4f, 5g.

Hydrocotyle rotundifolia, *Roxb.* At 3700', B. & H. 12915; fr. Feb. A creeping herb of Indo-Malaya; in Peninsula 9m.

Eryngium foetidum, *Linn.* At 3500' on banks, Hend., B. & H.; fr. March. A foetid herb of S. American origin; in Peninsula common.

ARALIACEAE.

Aralia ferox, *Miq.* 2000-4000', Kunstl. 5089, Ridl. 5230, B. & H.; fr. June, fruit Oct. A climber of Java and Borneo; in Peninsula 6e, 4f, 5g.

Schefflera affinis, *Viguier.* Larut Hills, Kunstl., fide Ridl. A shrub, endemic, 5h.

Schefflera elliptica, *Harms.* 200-4400', Wray 2136, Kunstl. 2541, Ridl., B. & H. 12673; fr. March, fruit June, Nov. A scandent shrub of Tenasserim and Java; in Peninsula 1b, 2b, 2d, 5h, 8h, 9m.

Schefflera Hullettii, *Viguier*. At 300', Wray 2323. An epiphytic or terrestrial shrub, endemic, 4g, Johore, 9m.

Schefflera lurida, *Ridl.* 3500-4000', *Ridl.*; fruit Dec. An epiphytic shrub, endemic, 4f.

Schefflera Ridleyi, *Viguier*. At 3600', B. & H. 12976; fr. and fruit March. An epiphytic shrub, endemic, common.

Schefflera scandens, *Viguier*. At 300', Curt. 2687; fruit May. A slender climber of Sumatra and Java; in Peninsula 4f.

Schefflera subulata, *Viguier*. 300-2900', *Ridl.*, *Hend.* 10081, B. & H. 12689; fr. Jan.-March. An epiphyte of W. Malaysia; in Peninsula common.

Schefflera tomentosa, *Viguier*. Wray 3152; fr. Sept. A shrub of Sumatra and Java; in Peninsula 3f, 4g, 4h, 5h, 9l.

Trevesia cheirantha, *Ridl.* 200-300', Wray 2332, *Hend.* 10064; fr. June, fruit Jan. Small prickly tree of Burma and Sumatra; in Peninsula common.

Arthrophyllum ovalifolium, *Miq.* At 200', *Hend.* 10123; fruit Jan. A small tree of Tenasserim and Sumatra; in Peninsula common.

Brassiopsis palmata, *Kurz.* At 2900', *Ridl.* 3018, B. & H. 13030; fruit Feb., March. A small prickly tree of India and Lower Siam; in Peninsula 4e, 4f.

CORNACEAE.

Mastixia bracteata, *Clarke*. Larut, *Kunstl.*, fide *Ridl.* A tree up to 60', endemic, 6k.

Mastixia rostrata, *Bl.* At 4000', *Fox*; fr. Oct. A tall tree of Java; in Peninsula 2d, 6k.

Alangium rotundatum, *Ridl.*, n. sp. 1000-3800', Curt. 2689, B. & H. 12851; fr. Feb., May. A tree, endemic and local.

Arálidium pinnatifidum, *Miq.* 100-300', Wray 3155. A small tree of Sumatra and Borneo; in Peninsula 2b, 6f, 5g, 5h, 6k, 7l, 9m.

CAPRIFOLIACEAE.

Viburnum sambucinum, *Bl.* At about 3800', *Ridl.*, B. & H. 12992; fr. March, June. A shrub or small tree of W. Malaysia; in Peninsula common.

RUBIACEAE.

Sarcocephalus Junghuhnii, *Miq.* At Taiping, *Kunstl.*, fide *Ridl.* A small tree of Indo-China to the Philippines; in Peninsula common.

Nauclea peduncularis, *G. Don.* 300-3000', Wray 3197, *Kunstl.* 3578; fr. Nov. A tree of Siam and Borneo; in Peninsula, 2d.

Uncaria attenuata, *Korth.* Wray 3150. A slender climber of Indo-Malaya; in Peninsula 5c, 6c, 2d, 6k, 9m.

Uncaria dasyoneura, *Korth.* Larut, Kunsth., fide Ridl. A climber of Ceylon and Java; in Peninsula 2d, 5g, 6k.

Uncaria ferrea, *DC.* 300-800', Scott. 130, Kunsth. 5390; flr. Jan. A slender climber of Indo-Malaya; in Peninsula 6e, 2d, 6d, 6t, 8g.

Uncaria Kunstleri, *King.* At 100', Kunsth. 5376; flr. and fruit Dec. A climbing shrub, endemic and local.

Uncaria pedicellata, *Rorb.* Larut, Kunsth., fide Ridl. A climber of W. Malaysia; in Peninsula common in open country.

Uncaria Roxburghiana, *Korth.* Larut, Kunsth., fide Ridl. A slender climber of Sumatra and Borneo; in Peninsula 5g, 5h, 9m, 0m.

Uncaria sclerophylla, *Rorb.* 100-4400', Derry, Hend. 10222, B. & H. 12944; flr. March, fruit Nov. A liane of W. Malaysia; in Peninsula common.

Uncaria trinervis, *Har.* At 300', Kunsth. 2981; fruit Oct. A slender climber, endemic, 2d.

Wendlandia paniculata, *DC.* 3800-4100', H. & N. 2349, B. & H. 12854, 12984; flr. Feb., March. A small tree of Indo-Malaya and China; in Peninsula 3e only.

Greenia Jackii, *Wight and Arn.* At about 1000', Ridl., flr. June. A shrub or small tree, endemic, from Langkawi to Malacca.

Argostemma diversifolium, *Ridl.* Up to 4000', Anders. 92, 102; flr. March. A succulent herb, endemic, 4d.

Argostemma elatostemma, *Hook. fil.* var. *obovata*, *King.* 2000-4500', Curt., Fox, Ridl., Horvey, Anders. 100; flr. March, May, June, Oct. A creeping herb, endemic, 2d, 5g, 6j, 9k.

Argostemma involucreatum, *Hemsl.* 2000-4700', Wray 696, Ridl. 11445 (var. *glabrum*), 2927, 11953 (var. *hirsutum*); flr. Feb. A creeping herb, endemic, common in the hills.

Argostemma nutans, *King.* Larut, Kunsth., fide Ridl. A succulent herb, endemic, 4f.

Argostemma pictum, *Wall.* 2000-3800', Ridl., B. & H. 12687, 12949, 13200; flr. March. A succulent herb of Tenasserim and Lingga; in Peninsula 1b, 2d, 6e, 4f, 5h, 9l.

Argostemma spinulosum, *Clarke.* 2000-4000', Wray 2953, Curt., Ridl. 2926, Anders. 123, B. & H. 13010; flr. March, May. A herb, endemic, 4f, 5g, 5h, 6j, 9k, 9l.

Argostemma unifolioides, *King.* 2300-4500', Wray 2314, Ridl. 11448, Hose 40; flr. Aug., fruit Dec. A tuberous herb, endemic, 4f.

Ophiorrhiza communis, *Ridl.* At 3000', Wray 2039, Curt.; fr. May. A herb of Borneo; in Peninsula, Kedah to Malacca.

Ophiorrhiza discolor, *R. Br.* 100-4500', *Ridl.*; fr. Feb., Aug. A herb, endemic, 2d, 6e, 5h, 6k, 7l, 9m.

Ophiorrhiza major, *Ridl.* Taiping Hills, *Ridl.* (not seen). A woody herb, endemic, common.

Ophiorrhiza pallidula, *Ridl.* At 300', Wray 1984. A herb, endemic, 4e, 6e, 5g, 5h.

Ophiorrhiza tenella, *King.* At about 4500', *Ridl.*; fr. March. A herb, endemic, 2c, 4e, 6g, 8g, 5h.

Hedyotis capitellata, *Wall.* 200-4000', *Ridl.*, *Anders.* 84, *Hend.* 10065, 10373, 10434; fr. Jan., March. A climbing shrub of Malaysia; in Peninsula common.

Hedyotis congesta, *Wall.* At 1000', *Hend.* 10017, 10194; fr. June, fruit Feb. A shrubby herb of Tenasserim, Sumatra and Borneo; in Peninsula common.

Hedyotis coronata, *Wall.* At about 4500', *Ridl.* A wiry herb of Burma and Siam; in Peninsula 1b, 2b, 4d, 6d, 4e.

Hedyotis hispida, *Retz.* Taiping Hills, *Ridl.*; fr. Feb. A herb of Indo-Malaya, China and Japan; in Peninsula 2d, 6d, 4f, 6f, 6k.

Hedyotis mollis, *Wall.* At 3800', *B. & H.* 12940; fr. March. A slender climber, endemic, 2d, 6d, 5j.

Oldenlandia Heynei, *Don.* 100-300', *Ridl.*, *Hend.* 10235, 10236; fr. Nov., fruit Aug. A wiry herb of Java; in Peninsula 2d, 3f, 7l, 9m.

Lucinaea membranacea, *King.* 2000-4000', *Curt.* 1337, 2016, *Ridl.* 5543; fr. Feb., May, June, Sept. An epiphytic climber of Borneo; in Peninsula 4f, 5g, 7l, 9m.

Lucinaea morinda, *DC.* 100-4500', *Kunstl.* 5498, 8482, *Curt.*; fr. Jan., Feb., Sept. A sprawler of W. Malaysia; in Peninsula 4f 5h, 8h, 6k, 9l, 9m.

Lucinaea Ridleyi, *King.* 1500-3600', *Kunstl.* 2162, *Ridl.* 2923, 11441, *B. & H.* 12942, 13203; fr. March, Aug. fruit Dec. An epiphytic climber of Borneo; in Peninsula 4f, 5g.

Mussaenda glabra, *Vahl.* 4000-4400', *Anders.* 59, *B. & H.* 12623; fr. March. A bush or climber of Indo-Malaya; in Peninsula, Taiping to Singapore.

Mussaenda mutabilis, *Hemsl.* 200-2000', Wray 91, 1846, *Curt.* 2023, *Ridl.* 14332; fr. July, Sept. A sprawler, endemic, Taiping to S. Johore.

Mussaenda oblonga, *King.* Larut, *Kunstl.*, fide *Ridl.* A shrub of Tavoy; in Peninsula 4d, 4e, 4f, 6f, 5g, 6k.

Mussaenda villosa, Wall. At 2000', Curt. 2024; fruit Sept. A shrub of Siam and Borneo; in Peninsula 1b, 2b, 6c, 2d, 6d, 4e, 5g, 7k.

Mussaenda Wrayi, King. 100-1000', Wray 2583, Kunstl. 1960, Hend. 10025, 10182; flr. Jan., June, fruit June. A scandent shrub, endemic, 2d, 5g, 5h.

Mycetia flava, Ridl. At 2000', Curt. 2021; flr. Sept. A small shrub, endemic, 1f.

Aulacodiscus premnoides, Hook. fil. 500-800', Wray 2562, 2665, Kunstl. 2392; flr. July, Sept. A tree up to 40', endemic, 2d, 4f, 5g, 5h, 5j, 8j, 9l, 9m.

Urophyllum ferrugineum, King and Gamble. 2000-4000', Curt. 2017, 3716, Ridl. 2930, 11443, B. & H. 12711, 13209; flr. March, May, Dec., fruit Feb.-May, Sept. A shrub, endemic, 2c, 4e, 4f, 9k.

Urophyllum glabrum, Wall. 300-2500', Wray 1825, 2079, 2592, 2940, Ridl., Anders. 151; flr. March, fruit Feb., March. A shrub of W. Malaysia and the Philippines; in Peninsula common.

Urophyllum Griffithianum, Hook. fil. Taiping Hills, Wray, fide Ridl. A large shrub or small tree of Sumatra and Java; in Peninsula common.

Urophyllum hirsutum, Hook. fil. 300-3000', Kunstl. 3236, H. & N. 2496; flr. Feb., Aug. A shrub or small tree, endemic and common.

Urophyllum macrophyllum, Korth. At 500', Hend. 10425; flr. Oct. A shrub or small tree of Tenasserim, Java and Borneo; in Peninsula 2d, 4d, 6e, 3f, 5g, 5h, 9m.

Urophyllum streptopodium, Wall. At 600', Hend. 10481; flr. Feb. A shrub of Borneo; in Peninsula common.

Urophyllum villosum, Wall. 300-1000, Wray 2631, Kunstl. 2563, Ridl., Hend. 10032, 10091, 10181, 10476; flr. June, Nov., fruit Jan., Feb., Dec. A shrub, endemic, 2d, 4e, 3f, 4f, 6g, 8j, 9m.

Brachytome Scortechinii, King and Gamble. 3500-4500', Wray 2999, Curt., H. & N. 2328, B. & H. 13014; flr. Feb., fruit March, Sept. A shrub, endemic, 2c, 4f, 5g.

Randia auriculata, Schum. 300-3200', Kunstl. 2514, 6467, Curt. 2020, B. & H. 12782; flr. Sept., Nov., fruit March, Aug. A woody climber of W. Malaysia to the Philippines; in Peninsula 2d, 4e, 4f, 6j, 8l, 9m.

Randia Curtisii, King and Gamble. 100-300', Kunstl. 3305, 6814; flr. Sept., fruit Nov. A spiny climber, endemic, 2d.

Randia densiflora, Benth. 300-1500', Wray 1851, Kunstl. 2752, 3893, 4222; flr. Jan., Feb. A shrub or tree of Indo-Australia, China and Japan; in Peninsula common.

Randia impressinervia, *King and Gamble*. At 200', Wray 2158; fr. June. A climber of Borneo; in Peninsula 4f.

Randia longiflora, *Lam.* 300-800', Kunstl. 5231; fr. Dec. A thorny climber of Indo-Malaya and China; in Peninsula common, usually in tidal rivers.

Randia macrophylla, *Hook. fil.* At 3000', Wray 3232. A shrub of Sumatra; in Peninsula common.

Randia oocarpa, *Ridl.* At Taiping, Scott., fide Ridl. A thorny bush, endemic, 1b, 2b, 8h.

Randia Scortechinii, *King and Gamble*. 500-1000', Wray 3212, Kunstl. 3453; fr. Oct. A bushy tree of Borneo; in Peninsula 2d, 4f, 5h, 6j.

Randia stenopetala, *Ridl.* 1000-3000', Curt. 1306, 3144; fr. Dec. A shrub, endemic, 4e, 4f.

Gardenia virescens, *Ridl.* 3800-4000', Ridl., B. & H. 13182; fr. March. A creeping shrublet, endemic and local.

Petunga Roxburghii, *DC.* At 4000', Anders. 83; fr. March. A bush or tree of Indo-Malaysia; in Peninsula, Kedah to Johore.

Petunga venulosa, *Hook. fil.* Taiping Hills, Wray, fide Ridl. A tree up to 60' of Borneo; in Peninsula 2d, 3f, 4f, 6k.

Diplospora Kunstleri, *King and Gamble*. 2000-3700', Kunstl. 3211, B. & H. 12717, 12774; fr. March, Aug., fruit March. A small tree, endemic, 7k.

Diplospora malaccensis, *Hook. fil.* At 3700', Anders., B. & H. 12977; fruit March. A small bushy tree of Sumatra and Borneo; in Peninsula common.

Diplospora Wrayi, *King and Gamble*. 2000-4000', Wray, Kunstl. 5277, 6253, Curt. 1304, Ridl. 5544; fr. June, fruit Feb., Dec. A shrub, endemic, 4d, 5h.

Jackia ornata, *Wall.* At 100', Kunstl. 5294, 8466; fr. Dec., fruit Feb. A small tree of Sumatra and Borneo; in Peninsula 3f, 4h, 6k, 9m.

Ixora arguta, *R. Br.* 200-2000', Wray 2135, Curt. 1303, Ridl.; fr. Dec., fruit June. A bush of Burma to Lower Siam; in Peninsula common.

Ixora concinna, *R. Br.* At 4700', B. & H. 12629; fr. March. A tree of St. Barbe Isle; in Peninsula Taiping to Singapore.

Ixora congesta, *Roxb.* 700-1000', Hend. 10116, 10202, 10203; fr. Jan., June. A small shrub of Tenasserim; in Peninsula common.

Ixora grandifolia, *Zoll. and Mor.* 100-4500', Kunstl. 5609, H. & N. 2455; fr. and fruit Feb. A shrub or tree of W. Malaysia; in Peninsula common.

***Ixora Kingstoni*, Hook. fil.** At Changkat Serdang, Wray. A large bush, endemic, Taiping to Johore.

***Ixora Lobbii*, Loud.** 1000-1400', Wray 519 (var. *angustifolia*), Fox 158, Derry, Anders. 152, Ridl., B. & H. 12713; flr. March, June, Oct. A shrub or small tree of Siam; in Peninsula the species common, the var. at 6d, 5h.

***Ixora pendula*, Jack**, var. *opaca*, Ridl. 100-3000', Kunstl. 1061, 4118, Curt. 2022, Ridl., Anders. 155, Hend. 10119, B. & H. 12698; flr. Jan.-April, Sept., fruit March. A shrub, the species in Sumatra; in Peninsula the species and var. common.

***Ixora stricta*, Roxb.** 2100-4500', Kunstl. 2247, Anders. 31; flr. March, Aug., fruit Aug. A shrub of Indo-Malaya and China; in Peninsula common.

***Pavetta graciliflora*, Wall.** Taiping Hill, Anders. 154; flr. March. A shrub of Lower Siam; in Peninsula common from Malacca northwards.

***Pavetta indica*, Linn.**, var. *canescens*, Ridl. 4000-4700', Ridl., Anders. 153, B. & H. 12591, 12666, 12857; flr. Feb., March, fruit March. A large bush, the species in Indo-Australia and S. China; in Peninsula the var. common, the species at 2h.

***Tarenna grandifolia*, Ridl.** At Maxwell's Hill, Derry. A small shrub, endemic and common.

***Tarenna longifolia*, Ridl.** 100-2500', Ridl. 2920, 14315; flr. Aug. A small shrub, endemic, 1a, 1b, 2d, 6j, 6k, 8k.

***Tarenna Ridleyi*, Pearson.** Taiping Hill, Anders. 105; flr. March. A small shrub, endemic, 4f, 8g, 6k, 7l, 9m.

***Tarenna Wallichii*, Ridl.** 100-500', Kunstl. 2516, 2794; flr. Feb., Nov. A shrub of Borneo; in Peninsula 2b, 2d, 8g, 6k.

***Stylocoryna costata*, Miq.** At 3200', B. & H. 12786; fruit March. A tree of Sumatra; in Peninsula 5h, 6j, 6k.

***Gardeniopsis longifolia*, Miq.** 2500-3500', Wray 2832, Kunstl. 2361, 2850, Ridl. 5343; flr. June, Sept., fruit March. A shrub of Sumatra; in Peninsula common.

***Timonius Wallichianus*, Valetton.** 300-1000', Kunstl. 5464, 6300; fruit Jan. A small tree, endemic and common on the West.

***Timonius Wrayi*, King and Gamble.** 500-1500', Wray 3200, Kunstl. 5168, 5781, 6781; flr. Oct., fruit Nov. A tree up to 50', endemic, 2d, 3f, 9k, 9m.

***Prismatomeris malayana*, Ridl.** 2500-3000', Wray 2948, Kunstl. 6344; flr. July, fruit Aug. A shrub or small tree of Indo-China and W. Malaysia: in Peninsula common.

***Morinda elliptica*, Ridl.** At 4000', Curt. 2016; flr. Sept. A small tree, endemic, very common. Hitherto confused with *M. citrifolia*, (Ridley).

Rennellia paniculata, *King and Gamble*. 3000-3500', Kunstl. 5432, Anders. 118, II. & N. 2354; flr. Jan., fruit Jan.-March. A shrub or small tree, endemic, 2d, 6d, 4f, 5h.

Rennellia speciosa, *Hook. fl.*, var. *elongata*, *King and Gamble*. 1000-1500', Kunstl. 3926, Curt.; flr. & fruit Feb. & Dec. A shrub, the species in Indo-Malaya; in Peninsula common.

Coelospermum scandens, *Bl.* 800-1000', Kunstl. 7248; fruit Feb. A slender climber of Malaysia; in Peninsula 6k, 9m.

Coelospermum truncatum, *King and Gamble*. At 100', Kunstl. 5508; fruit Feb. A shrubby climber of Tenasserim, Sumatra and Java; in Peninsula 2d, 6k, 9m.

Canthium horridum, *Bl.* 300-500', Kunstl. 6234; flr. June. A spiny shrub of Indo-Malaya and the Philippines; in Peninsula common.

Psychotria angulata, *Korth.* Taiping Hill, Anders. 106; flr. March. A shrub of Burma, Bangka and Borneo; in Peninsula common.

Psychotria Birchiana, *King and Gamble*. 300-4700', all collectors; flr. Feb., March, May, Aug., fruit Feb., March, Oct. A small shrub of Lower Siam; in Peninsula 4e, 6f, 5g, 5h.

Psychotria calocarpa, *Kurz.* At Maxwell's Hill, Ridl.; fruit Feb. A small shrub of India and Burma; in Peninsula 6d, 3f, 5h, 0j, 6k, 7k, 7l.

Psychotria montana, *Bl.* At Maxwell's Hill, Ridl. 2922; fruit March. A shrub of Burma, Sumatra and Java; in Peninsula 4d, 6d, 6e, 5g, 5h, 0j, 7k.

Psychotria morindaeiflora, *Wall.* At Maxwell's Hill, Curt. 2019; flr. Sept. A woody climber, endemic, 2d.

Psychotria ovoidea, *Wall.* 2000-3000', Ridl. 5545, B. & H. 13220; fruit March, June. A slender climber, endemic, 8g, 7j, 6k, 9k, 9l, 9m.

Psychotria penangensis, *Hook. fl.* Taiping Hills, Ridl.; flr. Dec., fruit March. A climber, endemic, common.

Psychotria rhinocerotis, *Reinw.* At Waterloo, 1500', Curt. 2695; fruit May. A small shrub of Java; in Peninsula 1b, 2b.

Psychotria rostrata, *Bl.* 300-500', Scort. 1482, Kunstl. 2190; flr. Aug. A shrub of W. Malaysia; in Peninsula common.

Psychotria sarmentosa, *Bl.* Taiping Hills, Ridl. 11442; flr. Dec. A climber of Indo-Malaya; in Peninsula common.

Psychotria Scortechinii, *King and Gamble*. 3000-4200', Fox 161, Ridl., H. & N. 2745; flr. Feb., Oct., fruit Feb. A climber, endemic and local.

Psychotria stipulacea, Wall. At Maxwell's Hill, Ridl. 2918, Anders. 101; fl. March. A shrub of Sumatra; in Peninsula common.

Psychotria viridiflora, Reinw. At 3900', Ridl. 2919, B. & H. 12950; fl. and fruit March. A large bush or small tree of Indo-Malaya; in Peninsula common.

Chasalia curviflora, Thw. 500-3800', Ridl. (var. *longiflora*), Hend. 10011, 10026, B. & H.; fl. Jan., Feb., March. A shrub of Indo-Malaya and the Philippines; in Peninsula common.

Cephaelis cuneata, Hook. fil. At 2000', Ridl.; fruit Dec. A small shrub, endemic, common.

Cephaelis Ridleyi, King. 300-2500', (cult., Ridl. 11440; fl. June, fruit May, Oct., Dec. A shrub, endemic, 5g.

Lasianthus appressus, Hook. fil. 600-3000', Ridl., Hend. 10103, B. & H. 12699; fruit Jan.-March. A shrub of Borneo; in Peninsula common.

Lasianthus attenuatus, Jack. Taiping Hills, Ridl.; fruit Dec. A shrub of Lingga; in Peninsula, Taiping to Singapore.

Lasianthus constrictus, Wight. 300-500', Kunsth. 2780; fruit Feb. A shrub of Burma, Java, and Borneo; in Peninsula common.

Lasianthus cyanocarpus, Jack. At 2500', Wray 2819. A shrub of Indo-Malaya to the Philippines; in Peninsula common.

Lasianthus ?glaberrimus, Ridl. At 3800', B. & H. 12645; fruit March. (Determination doubtful). A foetid shrub, endemic, 2d, 5g, 6k.

Lasianthus gracilis, King and Gamble. At 2000', Ridl. 2904; fruit March. A bushy shrub of Java; in Peninsula 4f.

Lasianthus Griffithii, Wight. At 2000', Ridl.; fruit Feb. A shrub of Lingga and Borneo; in Peninsula from Taiping to Singapore.

Lasianthus inaequalis, Bl. At 800', Wray 2588; fl. July. A shrub of W. Malaysia and the Philippines; in Peninsula 2d.

Lasianthus Lowianus, King and Gamble. 2000-3000', Kunsth. 2797, Ridl.; fl. Feb., fruit Dec. A foetid shrub, endemic, 2b, 4f, 5g, 5h.

Lasianthus Maingayi, Hook. fil. At Taiping, Ridl. 14338; fruit Aug. A shrub of Sumatra and Borneo; in Peninsula common.

Lasianthus montanus, King and Gamble. 3000-3500', Kunsth., fide Ridl. A bushy shrub, endemic, 6e.

Lasianthus oblongus, *King and Gamble*. 500-4000', Wray 2590, Kunsth. 4128, Curt. 2018, Ridl. 11438, Hend. 10200; fr. April, June, July, Sept., fruit June, Dec. A foetid shrub, endemic, common.

Lasianthus pilosus, *Wight*. At Waterloo, Curt.; fr. May. A shrub of ?Burma; in Peninsula 6d, 6f, 7f, 6k, 8k.

Lasianthus rhinocerotis, *Bl.* 4000-4700', Anders. 64, B. & H. 12660, 12878; fr. Feb., March. A shrub or small tree of Java and Borneo; in Peninsula 4c, 4f, 5g, 6g, 5h, 8l.

Lasianthus stipularis, *Bl.* At Taiping, Scort. 213; fruit March. A slender shrub of Malaysia; in Peninsula 4d, 6d, 6g, 5h, 9l, 9m.

Saprosma Scortechinii, *King and Gamble*. 2500-3000', Kunsth., fide Ridl. A shrub, endemic, 6d, 4f.

Saprosma ternatum, *Hook. fil.* 300-500', Wray 2262, Kunsth. 4006, Curt. 2088; fr. March, Sept. A shrub of Indo-Malaya; in Peninsula 6d, 6e, 7f, 6g, 5h, 6k, 7k.

Amaracarpus caudatus, *Ridl.* At about 4000', Wray, fide Ridl. A small foetid tree, endemic and local.

Paederia foetida, *Linn.* At 100', Kunsth. 7650; fr. May. A climber of Indo-Malaya and China; in Peninsula 1b, 2b, 2d, 6e, 4f, 8h, 6k, 8k, 9m.

Paederia verticillata, *Bl.* 100-500', Kunsth. 5316, Hend. 10145; fr. Feb., Dec. A climbing shrub of W. Malaysia to the Philippines; in Peninsula common.

Borreria hispida, *Schum.* At Taiping, Hend. 10234; fr. Nov. A rough wiry herb of Indo-Malaya and China; in Peninsula common.

Spermacoce ocymoides, *Burm.* At Maxwell's Hill, B. & H. A pantropic weed, common in the Peninsula.

Cinchona succi-rubra, *Par.* At 3600', B. & H. 12644; fr. and fruit March. Cultivated. A native of S. America.

COMPOSITAE.

Elephantopus scaber, *Linn.* At Taiping, Hend. 10247; fruit Jan. A rough herb, pantropic; in Peninsula common.

Mikania scandens, *Willd.* Roadsides, Taiping, Hend. 10018; fr. Jan. A shrub or climber, pantropic; in Peninsula common.

Ageratum conyzoides, *Linn.* 2000-3800', Hend. 10132, B. & H. 12553; fr. Jan., March. A herb, pantropic; in Peninsula very common.

Bidens pilosa, *Linn.* Maxwell's Hill clearing, B. & H. A pantropic herb; in Peninsula common.

Synedrella nodiflora, *Gaertn.* At 300', Hend. 10308; fr. Aug. A herb, pantropic; in Peninsula common.

Vernonia cinerea, Less. 200-4000', Hend. 10000, B. & H.; flr. and fruit all the year. A pantropic herb; in Peninsula very common.

Emilia sonchifolia, King and Gamble. 200-1750', Hend. 10213, B. & H.; flr. Sept. A herb, pantropic; in Peninsula common.

Erechthites valerianifolia, DC'. At 1750', B. & H. 12889; flr. and fruit Feb. A herb, pantropic; in Peninsula common.

Blumea balsamifera, DC'. At 200', Hend. 10146; flr. Feb. Ngai camphor. A shrub of Indo-Malaya; in Peninsula common.

Blumea chinensis, DC'. At about 3700', Ridl., B. & H. 12775; fruit Feb., March. A climber of Indo-Malaya; in Peninsula common.

Blumea densiflora, DC'. 3700-1000', Hervey, Ridl., B. & H. 12777; flr. Feb., March. A shrub of Himalaya, Burma and Java; in Peninsula 3c only? Apparently rare.

Blumea lacera, DC'. At Taiping, Hend. 10163; fruit April. A herb of Trop. Africa and Asia; in Peninsula common.

Blumea membranacea, DC'. Larut Hills, Ridl. A herb of Indo-Malaya; in Peninsula common, especially in the North.

Dicrocephala latifolia, DC'. At Taiping, Ridl. (not seen). A herb of Trop. Africa and Asia; in Peninsula 3c only.

Crepis japonica, Benth. At 3700', B. & H. 12648; fruit March. A herb of the Tropics of the Old World; in Peninsula 2b, 2d, 4e, 6k, 7l, 8l.

Galinsoga parviflora, Cav. 100-3700', Ridl. 11938, B. & H. 12911; flr. Feb. A herb, introduced from Trop. America. Also in Java.

Tithonia diversifolia, Gray. Running wild on edge of Maxwell's Hill clearing, B. & H. An American herb.

LOBELIACEAE.

Lobelia affinis, Wall. 300-4000', Kunstl. 2376, Curt. 2025, Anders. 85; flr. Sept., fruit March, Sept. A creeping herb of Indo-Malaya and China; in Peninsula common.

Isotoma longiflora, Presl. 200-2000', Hend. 10121, 10378; flr. and fruit Jan. A herb of the W. Indies; in Peninsula an escape from cultivation.

CAMPANULACEAE.

Campanumaea celebica, Bl. At 4000', Curt. 2089; fruit Sept. A herb of Indo-Malaya; in Peninsula 5g.

Pentaphragma Scortechinii, King and Gamble. 2000-4000', Kunstl. 2653, Ridl. 2896, Hend. 10128; flr. Jan. An erect herb, endemic, common.

VACCINIACEAE.

Agapetes perakensis, *Ridl.* 3000-4000', *Kunstl.* 6363, *Fox* 165, *Ridl.* 5532, *H. & N.* 2479, *B. & H.* 12682; flr. Feb., June, fruit March, July. An epiphytic climber, endemic, 4f, 5g.

Vaccinium acuminatissimum, *Miq.* 300-1500', *Kunstl.*, fide *Ridl.* A small epiphytic shrub of W. Malaysia; in Peninsula 4f, 9m.

Vaccinium bancanum, *King.* 3500-4750', *Kunstl.* 7018, 8415, *Anders.* 49, *B. & H.* 12573, 12620; flr. Jan., March, fruit March, Dec. A shrub of W. Malaysia; in Peninsula 6e, 5g, 5h, 7k.

Vaccinium Hasseltii, *Miq.* At 3500', *H. & N.* 2360; flr. Feb. A large epiphytic shrub of Sumatra and Java; in Peninsula 2c, 6g, 5h, 8h, 9m.

Vaccinium perakense, *Ridl.* 3000-4000', *Curt.* 3703, *Ridl.*; flr. March. A shrub or small tree, endemic, 6e, 6g, 9k.

ERICACEAE.

Diplycosia microphylla, *Becc.* 4500-4750', *Curt.*, *B. & H.*; flr. Sept. An epiphytic shrub of Borneo; in Peninsula, Kedah Peak to Mt. Ophir.

Rhododendron jasminiflorum, *Hook.*, var. *maculata*. 4000-4200', *Curt.*, *Fox* 124, *Derry*, *B. & H.* 12621; flr. Oct., fruit March, Oct. An epiphytic shrub of W. Malaysia; in Peninsula the species at 2c, 7k, 9k, the var. at 6e, 4f, 5g, 9k.

Rhododendron javanicum, *Benn.* 2500-4570', all collectors; flr. March, Sept., Oct., Dec., fruit March, Dec. An epiphytic shrub of W. Malaysia except Borneo; in Peninsula 2c, 2d, 5g, 5h.

Rhododendron longiflorum, *Lindl.* 500-2500', *Kunstl.* 5181, *B. & H.* 13205; flr. March, Nov. An epiphytic or terrestrial shrub of Sumatra and Borneo; in Peninsula 2c, 6e, 4f, 5h, 6j, 9m.

Rhododendron malayanum, *Jack.* 4000-4750', *Wray* 614, *Curt.* 2029, *Ridl.*, *H. & N.* 2319, *Anders.* 39, *Derry*, *B. & H.*; flr. Feb., March, Sept., Oct. A small epiphyte of W. Malaysia; in Peninsula 4e, 6e, 4f, 5g, 5h, 7k.

MYRSINACEAE.

Maesa indica, *Wall.* 2000-3000', *Scort.* 365, *Ridl.* 3007; flr. April. A shrub or small tree of Indo-Malaya; in Peninsula 5g.

Maesa macrothyrsa, *Miq.* At Taiping, *Hend.* 10248; flr. Nov. A climber of Sumatra and Borneo; in Peninsula 3e only.

Maesa ramentacea, *Wall.* 200-300', *Kunstl.* 2788, 4144; flr. Feb., fruit April. A climber or tree of Indo-Malaya; in Peninsula common.

Myrsine Porteriana, Wall. At about 4000', Ridl. 2992, B. & H. 12760; flr. March, fruit Feb. A shrub or small tree of Sumatra; in Peninsula 2d, 8g, 5h, 7k, 9k, 9l.

Embelia amentacea, Clarke. 800-1000', Kunstl. 6280; flr. and fruit July. A slender climber of Borneo; in Peninsula 3f, 5g, 5h, 6k, 9m.

Embelia coriacea, Wall. 100-4700', all collectors; flr. Oct., Nov., fruit Feb., Aug., Sept., Nov. A liane of W. Malaysia and the Philippines; in Peninsula common.

Embelia dasythyrsa, Miq. At 300', Kunstl. 4103; fruit April. A slender climber of Bangka and Borneo; in Peninsula 4f, 5h, 6k.

Embelia Lampani, Scheff. 500-1000', Kunstl. 4210; flr. May. A slender climber of Sumatra; in Peninsula 2d, 5h, 6k, 9m.

Embelia parviflora, Wall. 3800-4000', B. & H. 12939; fruit March. A slender climber of Burma and Sumatra; in Peninsula 3e only.

Labisia pothoina, Lindl. 2500-4700', Wray 753, B. & H.; flr. and fruit March. A herbaceous undershrub of W. Malaysia; in Peninsula common.

Ardisia andamanica, Kurz. At Maxwell's Hill, Wray 108. A tall shrub of Tenasserim; in Peninsula 4f, 5g, 5h, 7k, 8l.

Ardisia colorata, Roxb. 100-3800', Scort. 1505, Kunstl. 3284, 3567, Curt., Anders. 149, H. & N. 2332, B. & H. 12683, 13191; flr. Feb., March, Nov., fruit March, May, Aug. A shrub or small tree of Indo-Malaya; in Peninsula common.

var. *polyneura*, Clarke. 2000-2500', Wray 2810, Ridl. 3000, 5508; fruit Feb., June, Aug. Distrib: Lower Siam; in Peninsula 4f, 5h, 6k, 9m.

var. *salicifolia*, King and Gamble. 1800-3000', Wray 2960, Kunstl. 3216, 6816, Ridl.; flr. Aug., Nov., fruit Aug., Dec. Distrib: Lower Siam; in Peninsula 2d, 5g, 6k.

Ardisia crenata, Roxb. At 2000', Ridl. 2899. A bush of Indo-Malaya, China and Japan; in Peninsula common.

Ardisia Kunstleri, King and Gamble. 300-800', Kunstl. 4071, 4100; flr. March, fruit April. A shrub up to 20', endemic, 4f.

Ardisia lanceolata, Roxb. 300-2000', Kunstl. 2954, Curt.; flr. April, May. A tree about 40', of W. Malaysia and the Philippines; in Peninsula common.

Ardisia oxyphylla, Wall. At 2000', Curt.; flr. May. A shrub of Tenasserim, Lower Siam and Borneo; in Peninsula 1a, 2d, 4d, 3f, 6j, 6k.

Ardisia porosa, Clarke. 200-4500', Wray 2160, 2835, Scort. 116a, Ridl. 14262, Hend. 10454; flr. Feb., June, Aug., Dec. A shrub, endemic, 2d, 6j, 6k.

Ardisia Ridleyi, *King and Gamble*. 2500-4000', Ridl. (not seen). A shrub of Sumatra; in Peninsula 1b, 6e, 5g, 7k, 9l, 9m.

Ardisia rosea, *King and Gamble*. 2500-4300', Kunstl. 6247, Ridl. 5511, Anders. 71, B. & H. 12598, 13027; flr. and fruit March and June. A shrub or small tree, endemic, 6e, 4f, 5g.

Ardisia solanacea, *Roxb.* At about 2500', Wray 3000; flr. Sept. A shrub or tree of India and Burma; in Peninsula 4f, 5h.

Ardisia villosa, *Roxb.* 500-2000', Wray 2801 (var. *glabrata*). 3149, Kunstl. 6448, Ridl.; flr. Aug., fruit Aug., Sept. A small shrub of Indo-Malaya; in Peninsula common.

Ardisia virens, *Kurz.* 3800-4000', Ridl., B. & H. 12969; flr. and fruit March. A big shrub of Indo-China and Borneo; in Peninsula 4f.

Ardisia Wrayi, *King and Gamble*. At 300', Wray 3280; fruit Oct. A small shrub, endemic and local.

Antistrophe caudata, *King and Gamble*. At 2000', Ridl.; fruit Feb. A shrub or small tree, endemic, 4f, 5h, 6j.

Antistrophe Curtisii, *King and Gamble*. At 4000', Curt. 3390; flr. June. A shrub, endemic, 4e.

SAPOTACEAE.

Sideroxylon malaccense, *Clarke*. 300-1000', Wray 136, Kunstl. 6550; flr. Sept. A tree up to 60', endemic, 2d, 5h, 6k, 9m.

Payena dasphylla, *Pierre*. At 3500', Kunstl., fide Ridl. A tree up to 100', of Sumatra and Java; in Peninsula 3e only, except a var. in Perak and Singapore.

Payena Leerii, *Kurz.* At Taiping, Barnard, C.F. 946. A tree up to 100', of W. Malaysia and the Philippines; in Peninsula 4f.

Bassia Braceana, *King and Gamble*. 100-500'. Kunstl. 3195, 3740, 6447; flr. Aug., fruit Jan. A tree up to 70', endemic, 2d, 4f.

Bassia Curtisii, *King and Gamble*. Waterfall Hill, Wray 512. A tree up to 80', endemic 2d.

Bassia Kunstleri, *King and Gamble*. 500-2000', Wray 2463, Kunstl. 6410, Ridl. 5536, Derry; flr. Aug., fruit June, Oct. A tree up to 60', endemic and local.

Bassia laurifolia, *King and Gamble*. At 300', Kunstl. 3720; fruit Jan. A tree up to 60', endemic, 2c, 2d, 3d, 5h.

Bassia longistyla, *King and Gamble*. At 300', Kunstl. 2680; flr. Jan. A tree up to 100', endemic and local.

Bassia Motleyana, *Clarke*. 100-1000', Wray, Kunstl. 5454 (var. *Scortechinii*); flr. Jan. A tree about 80', of Borneo; in Peninsula 5j, 6k, 9l, 9m.

Bassia perakensis, *King and Gamble*. At 2000', Derry (Curt. 3695); fruit Sept. A tree up to 80', endemic and local.

Palaquium bancanum, *Burck.* 300-500', Kunsth. 6506; flr. Aug. A tree up to 150', endemic, 2d, 9m.

Palaquium Clarkeianum, *King and Gamble*. At 600', Wray 530. A tree up to 100', endemic, 1h, 5h, 6k.

Palaquium Gutta, *Burck.* 100-2800', Curt. 3637, 3725, Stephens, B. & H.; fruit Aug. The Gutta Percha tree. A tree up to 100', of W. Malaysia; in Peninsula common.

Palaquium Maingayi, *King and Gamble*. At Changkat Serdang, Wray. A tree up to 60', endemic, 5h, 6j, 6k.

Palaquium Oxleyanum, *Pierre*. 300-3000', Wray 518 (var. *glabrata*), 590, Curt. 3638, 3724, Derry. A lofty tree, the var. only in Lower Siam; in Peninsula 6f, 5h, 9m.

Palaquium xanthochymum, *Pierre*. Larut, Kunsth., fide Ridl. A tree up to 120', of Bangka and Borneo; in Peninsula 6k, 9m.

EBENACEAE.

Diospyros apiculata, *Hiern*. 500-800', Kunsth. 5127, 6770; flr. Oct., Nov. A shrub, endemic, 2d.

Diospyros argentea, *Griff.* 3000-4000', Kunsth. 6896, Ridl.; flr. Nov. A shrub, endemic, 6e, 3f, 4f, 5h, 6k, 9m.

Diospyros bilocularis, *Oliv.* 1500-2000', Kunsth. 7383; fruit March. A tree about 80', endemic, 6k, 9m.

Diospyros ellipsoidea, *King and Gamble*. 500-1000', Kunsth. 7269; flr. and fruit Feb. A shrub or tree, endemic, 4f.

Diospyros flavicans, *Hiern*. 300-1500', Kunsth. 3072, 3380, 3774, 6633; flr. Sept., fruit Jan., June. A shrub or tree, endemic, 1a, 2d, 4f, 5g, 6k.

Diospyros graciliflora, *Hiern*. 300-2500', Wray 3214, Kunsth. 5173, 6742; flr. Oct., fruit Sept. A tree up to 50', of Java and Borneo; in Peninsula 2c, 2d, 4f.

Diospyros nutans, *King and Gamble*. Larut Hills, Kunsth., fide Ridl. A shrub up to 15', endemic, 4f, 9l.

Diospyros oblonga, *Wall.* 1000-2000', Kunsth. 4924; fruit Oct. A tree up to 70', endemic, 2d, 3f, 6k, 9m.

Diospyros rigida, *Hiern*. 100-2500', Wray, Kunsth. 4204; fruit March. A tree up to 40', endemic, 4d, 4f.

Diospyros rufa, *King and Gamble*. 300-3500', Kunsth. 3330, 5409, 6712; fruit Jan., Sept., Oct. A tree up to 80', endemic, 6k.

Diospyros Scortechinii, *King and Gamble*. 2000-4000', Wray 638, Kunsth. 4126, 5296, 6356, Curt. 2092, Ridl.; flr. April, July, fruit Sept., Dec. A tree up to 50', endemic, 2d, 4f, 5g, 5h.

Diospyros subrhomboidea, *King and Gamble*. 1000-1500', Kunstl., fide Ridl. A shrub, endemic, 5g, 5h.

Diospyros toposioides, *King and Gamble*. 1000-1500', Kunstl. 4106; fruit April. A tree up to 40', endemic, 3f, 4f, 5h.

Diospyros tristis, *King and Gamble*. Larut, Kunstl., fide Ridl. A tree up to 50', endemic and local.

Diospyros Wallichii, *King and Gamble*. 200-500', Wray 2535, Kunstl. 2966, 6179; fr. April, Oct., fruit July. A tree up to 60', of Lower Siam; in Peninsula 1b, 2d, 4f, 5h, 6k.

STYRACACEAE.

Styrax benzoin, *Dryand*. At 2500', B. & H. 12828; fruit March. A tree up to 80', of Sumatra and Java; in Peninsula 4f, 5h, 6j, 6k, 9m.

Symplocos adenophylla, *Wall*. 3500-4000', Kunstl. 6873; fr. Nov. A shrub or small tree of Sumatra, Borneo and Philippines; in Peninsula 2c, 2d, 6c, 5g, 6k, 9k, 9m.

Symplocos Brandiana, *King and Gamble*. 3000-4000', Scort. 346, Curt. 2030; fr. March, Sept. A small tree, endemic and local.

Symplocos calycodactylos, *Brand*. At Waterloo, 3000', Curt. 1330; fr. Dec. A shrub?, endemic and local.

Symplocos cerasifolia, *Wall*. 2500-3500', Wray 3003, H. & N. 2326; fruit Feb., Sept. A tree up to 80', endemic, 2d, 6k.

Symplocos Curtisii, *Oliv*. 1800-4500', Wray 692, 2830, Kunstl. 2099, 2804, Curt., Ridl. 5524, H. & N. 2453; fr. Feb., May, July, fruit June-Aug. A shrub or small tree, endemic, 2d, 4f.

Symplocos fasciculata, *Zoll*. 100-800', Wray 1865, Scort. 1527, Kunstl. 2021, 5337; fr. May, July, Nov., Dec. A tree up to 50', of W. Malaysia; in Peninsula 4c, 5h, 6j, 6k, 9m.

Symplocos ferruginea, *Roxb*. Larut Hills, Kunstl., fide Ridl. A tree up to 60', of Indo-Malaya; in Peninsula 2d, 4f, 5g, 8h, 6k.

Symplocos perakensis, *King and Gamble*. At about 2500', Wray 2944, 2953; fr. July, Aug. A tree up to 60', endemic, 4f, 7g, 5h.

Symplocos rigida, *Clarke*. 500-3000', Wray 3207, Kunstl. 5045, Curt. 3726, H. & N. 2386; fr. Oct., fruit Feb., Sept., Oct., Dec. A tree up to 80', endemic, 4f, 5g, 6k, 9m.

Symplocos spicata, *Roxb*. 2500-4400', Wray 2798, Kunstl. 6299, B. & H. 12951; fr. July, fruit March, Aug. A tree up to 20', of Indo-Malaya and China; in Peninsula 5h, 8h, 6k.

Cordyloblaste Maingayi, *Ridl*. 300-800', Kunstl., fide Ridl. A tree up to 60', endemic, 6k.

OLEACEAE.

Jasminum bifarium, Wall. At Taiping, Hendl. 10216, 10281; fr. Jan., Nov. A sprawler of W. Malaysia and the Philippines; in Peninsula common.

Jasminum insigne, Bl. At Tupai, Wray 2840; fr. Aug. A liane of Sumatra; in Peninsula 6e, 4f.

Jasminum Maingayi, Clarke. 500-3000', all collectors; fr. Feb., March, fruit Dec. A climber, endemic, 2h, 2d, 4f, 5h, 7l.

Jasminum Scortechinii, King and Gamble. 2000-4500', all collectors; fr. Feb.-April, Sept.-Dec., fruit Feb. A climber, endemic, 2d, 5g.

Jasminum Wrayi, King and Gamble. 300-1000', Wray 3147. Ridl.; fr. Sept. A slender climber, endemic, 5h.

Osmanthus Scortechinii, King and Gamble. 100-4500', Wray, Kunstl., fide Ridl. A tree up to 50', endemic, 5h.

Linociera paludosa, King and Gamble. At 100', Kunstl. 6476; fr. Aug. A tree up to 80', of Borneo and the Philippines; in Peninsula 3e only.

Myxopyrum nervosum, Bl. 100-300', Wray 2534, 4179, Scort. 532; fr. June, fruit April, July. A liane of Sumatra and Java; in Peninsula 2d, 4f, 5g, 6g, 6k.

APOCYNACEAE.

Willughbeia coriacea, Wall. At 1000', Wray, H. & N. 2396; fruit Feb. A large liane, endemic, 1b, 2d, 6k, 9k, 9m.

Willughbeia edulis, Roxb. At 2000', H. & N. 2381; fruit Feb. A liane of Assam, Burma and Borneo; in Peninsula 3f.

Willughbeia firma, Bl. At Waterfall Hill, Wray. A large liane of W. Malaysia; in Peninsula common.

Chilocarpus atroviridis, Bl. 2500-3000', Scort., Kunstl., fide Ridl. A slender climber of Tenasserim; in Peninsula 5h, 6k.

Chilocarpus costatus, Miq. At Changkat Serdang, Wray. A liane of Sumatra; in Peninsula 2d, 4e, 7g, 5h, 6k, 8l.

Chilocarpus enervis, Hook. fl. 300-500', Kunstl. 3786, 7532; fruit Jan. April. A liane of Borneo; in Peninsula 4f, 6j, 6k, 9l.

Chilocarpus minutiflorus, King & Gamble. Larut, Kunstl., fide Ridl. A climber, sometimes epiphytic, endemic and local.

Leuconotis eugenifolius, DC. At Waterfall Hill, Wray, fide Ridl. A climber of Sumatra and Borneo; in Peninsula 2d, 4e, 5g.

Leuconotis Griffithii, Hook. fl. At Taiping, Wray. A climber, endemic, 5h, 6j, 6k, 9m.

Melodinus citriformis, *King and Gamble*. 500-800', Kunstl., fide Ridl. A slender climber, endemic and local.

Melodinus coriaceus, *Oliv.* At 300', Wray, fide Ridl. A liane, endemic, 2d.

Melodinus orientalis, *Bl.* At 3000', Seort. 355; fr. April. A liane of Sumatra and Java; in Peninsula 2d, 4f.

Alyxia Forbesii, *King and Gamble*. 3200-3800', Kunstl. 2124, B. & H. 12978; fr. July, fruit March. A climber of Sumatra and Java; in Peninsula 2d, 4d, 5g, 6g.

Hunteria corymbosa, *Roxb.* At 300', Kunstl. 7465; fr. April. A tree up to 40', of India and Sumatra; in Peninsula 1b, 2d, 5h, 6j.

Rauwolfia perakensis, *King and Gamble*. 3600-4300', Ridl. 2898, 5523, H. & N. 2338, B. & H. 12582, 12625; fr. Feb., March, fruit June. A shrub of Lower Siam; in Peninsula 2c, 4d, 6d, 8d, 4f, 6f, 5g, 5h, 8h.

Ervatamia corymbosa, *King and Gamble*. At 2900', B. & H. 12691; fruit March. A shrub or tree, endemic and common.

Ervatamia cylindrocarpa, *King and Gamble*. At 3200', B. & H. 12684; fruit March. A shrub, endemic, from Penang to Malacca.

Ervatamia peduncularis, *King and Gamble*. 200-300', Wray 1936, Kunstl. 1858, Hend. 10076; fr. June, fruit Jan., May. A shrub, endemic and common as far south as Mt. Ophir.

Dyera costulata, *Hook. fil.* Jelutong. Common on the lower slopes of the hill, B. & H. A tree up to 250', of Sumatra; in Peninsula common.

Alstonia angustiloba, *Miq.* At 300', Wray, Kunstl., fide Ridl. A tree up to 100', of Java, Borneo and the Philippines; in Peninsula 2d, 5g, 9m.

Pottsia cantoniensis, *Hook. and Arn.* 500-800', Kunstl. 2318; fr. Sept. A liane of Java; in Peninsula 2d, 3d, 4f, 6k.

Strophanthus dichotomus, *DC.* 300-500', Kunstl. 3896; fr. Feb. A sprawler of Java; in Peninsula 4f, 6f, 6k, 8k, 9m.

Urceola brachysepala *Hook. fil.* At 3800', B. & H. 12560; fr. March. A liane, endemic, 2d, 6k, 9m.

Urceola elastica, *Roxb.* 800-3500', Wray 4273, Kunstl. 2241, 4239, 5061, 7567; fr. May, fruit Aug., Oct. A large liane of Sumatra; in Peninsula 2d, 4f, 6k.

Parameria polyneura, *Hook. fil.* 200-500', Kunstl. 3337, 7491; fr. April, Sept. A liane of Burma, Sumatra and Borneo; in Peninsula 2d, 6k, 9m.

Ecdysanthera multiflora, *King and Gamble*. 2000-3000', Kunstl., fide Ridl. A liane, endemic and local.

Chonemorpha penangensis, *Ridl.* At 500', Kunstl. 3636; flr. Dec. A liane, endemic, 2d, 4d, 1f, 6g, 6k.

Anodendron Candolleianum, *Wight.* 100-500', Kunstl. 5558, 6516; flr. Feb., Aug. A liane of Borneo; in Peninsula 2d, 4e, 6k.

Anodendron pauciflorum, *Hook. fil.* 100-800', Kunstl. 5587. 5599; flr. Feb. A climber up to 15', endemic, 2d.

Cleghornia gracilis, *King and Gamble.* At 1000', Kunstl., Scort., fide Ridl. A slender climber, endemic and local.

Trachelospermum Curtisii, *King and Gamble.* Larut, Kunstl., fide Ridl. A climber, endemic, 2d.

Micrechites furcata, *Ridl.* 300-500', Kunstl. 6564; flr. Sept. A liane, endemic, 4g.

Micrechites tubulosa, *Ridl.*, n.sp. At 3200', B. & H. 12785; flr. March. A liane, endemic and local.

ASCLEPIADACEAE.

Phyllanthera perakensis, *King and Gamble.* About 200', Kunstl., fide Ridl. A climber, endemic and local.

Streptocaulon Wallichii, *Wight.* At 2000', Ridl.; flr. and fruit March. A woody climber, endemic, 1b, 2b, 2d, 6d, 3f.

Toxocarpus Scortechinii, *King and Gamble.* At 3600', Derry (Curt. 3706). A twining shrub, endemic and local.

Goniostemma acuminatum, *Wight.* Taiping Hills, Wray, Kunstl., fide Ridl. A slender climber of Assam; in Peninsula 2d.

Genianthus Maingayi, *Hook. fil.* Larut, Kunstl., fide Ridl. A slender climber, endemic, 9m.

Genianthus Ridleyi, *King and Gamble.* At 3500', Ridl. 2988, 11988; H. & N. 2366; flr. Feb. A climber, endemic and local.

Genianthus rufo-velutinus, *King and Gamble.* At 300', Kunstl. 5611; flr. Feb. A liane, endemic and local.

Cyanchum corymbosum, *Wight.* 300-500', Kunstl., fide Ridl. A slender twiner of Himalaya and Assam; in Peninsula 2d.

Cyanchum ovalifolium, *Wight.* At Taiping, Kunstl., fide Ridl. A slender climber of Java; in Peninsula common.

Pentasacme caudatum, *Wall.* 300-3000', Curt., Ridl. 2885; flr. Dec. A herb of India and Burma; in Peninsula 4d, 4e, 6e, 4f, 5g, 5h.

Tylophora exilis, *Colebr.* Larut, Kunstl., fide Ridl. A slender twiner of Assam; in Peninsula 3f, 5h, 6k.

Tylophora longifolia, *Wight.* 3700-4000', all collectors; flr. March, June, Oct., Sept., Dec. A twiner of India and Borneo; in Peninsula 3e only.

Tylophora Wallichii, *Hook. fl.* At 3000', H. & N. 2306; fr. Feb. A slender twiner of Borneo; in Peninsula 2d, 6j, 6k, 9m.

Heterostemma piperifolium, *King and Gamble* At Taiping, Ridl. 14268; fr. Aug. A slender twiner, endemic, 4e, 4f, 5h.

Hoya citrina, *Ridl.* At Batu Kurau, Scort., fide Ridl. A long climber, on limestone, endemic, 4f, 5h.

Hoya coronaria, *Bl.* At 300', Hend. 10315, 10319; fr. and fruit Aug. A long climber of Malaysia; in Peninsula 2d, 8d, 3f, 4f, 8g, 7l, 9m.

Hoya Curtisii, *King and Gamble*. Waterloo, at 2000', Curt. 2894; fr. Oct. A creeping epiphyte, endemic and local.

Hoya lacunosa, *Bl.* Larut, Kunstl., fide Ridl. A creeping epiphyte of W. Malaysia; in Peninsula 6k, 9m.

Hoya Maingayi, *Hook. fl.* 3700-4500', Ridl., Anders. 55, H. & N. 2452, B. & H. 12750, 12964; fr. Feb., March, fruit Feb. A climber, endemic, 6k.

Hoya multiflora, *Bl.* 2000-2600', Ridl. 5520, Hend. 10124; fr. Jan., June. A small epiphytic shrub of Indo-Malaya; in Peninsula 2d, 4f, 6f, 5g, 5h, 0j, 7k, 8l.

Hoya plicata, *King and Gamble*. At 3000', Scort., fide Ridl. A climber, endemic and local.

Hoya revoluta, *Wight*. Maxwell's Hill, Ridl.; fr. June. A slender climber, endemic, common.

Hoya Ridleyi, *King and Gamble*. At 2400', Ridl. (not seen). A long climber of Lower Siam; in Peninsula common.

Dischidia albida, *Griff.* Taiping Hills, Scort., fide Ridl. A slender creeper, endemic, 6e, 4f, 5g, 6k, 7k, 8l, 9m.

Dischidia astephana, *Scort.* 3600-4750', H. & N. 2341, B. & H.; fruit Feb. A slender creeper, endemic, 4e, 6e, 4f, 6g, 5h.

Dischidia benghalensis, *Colebr.* 3200-4750', B. & H. 12655, 12796; fr. March. A sprawler of Java and Borneo; in Peninsula common.

Dischidia coccinea, *Griff.* 4000-4500', Ridl. 2903, Fox; fr. Oct. A slender creeper of Borneo; in Peninsula 8g, 6k, 9m.

Dischidia cordifolia, *King and Gamble*. At 2000', Ridl.; fr. Feb. A twining shrub, endemic, 6g.

Dischidia hirsuta, *Decne.* At 300', Wray, fide Ridl. A slender creeper of Indo-Malaya; in Peninsula 2d, on the Southern coasts in 4h, 8h, 6k, 9k, 9m, inland in 5h, and in varieties in 4f, 7k, 8l.

Dischidia Rafflesiana, *Wall.* Larut, Kunstl., fide Ridl. A creeper of Malaysia to Australia; in Peninsula 1b, 2b, 2c, 8g, 7k, 9m.

Dischidia Scortechinii, *King and Gamble*. At 1200', B. & H. 12617; flr. March. A slender creeper, endemic, 5g.

Dischidia tubuliflora, *King and Gamble*. Taiping Hills, Ridl.; fruit Dec. A wiry creeper, endemic, 1e, 1f.

Dischidia sp. At 1700', B. & H. 12610; flr. March. A creeper with small pink flrs.

Physostelma Wallichii, *Wight*. Taiping Hill, Ridl.; flr. Feb. A wiry twiner of W. Malaysia; in Peninsula 6e, 3f, 11, 9m.

LOGANIACEAE.

Buddleia asiatica, *Lour.* 300-500', Kunstl. 4060; flr. March. A small shrub of Indo-Malaya and China; in Peninsula 2d, 1d.

Fagraea auriculata, *Jack.* 4000-4200', Curt., Fox, H. & N. 2344, B. & H. 12613, 12861; flr. Oct., fruit Feb., March, Oct. An epiphyte then a tree up to 30', of Indo-China and W. Malaysia to the Philippines; in Peninsula 3f, 5h, 8h, 6k, 7l, 9l, 9m.

Fagraea carnosa, *Jack.* At 300', Wray 2317; flr. June. An epiphytic shrub of Burma and Sumatra; in Peninsula 3f.

Fagraea lanceolata, *King and Gamble, non Blume.* At about 2500', Wray 3202; fruit Sept. An epiphytic climber, endemic, 5g. A doubtful species of which flowers have not been collected.

Fagraea oblonga, *King and Gamble.* 2000-4000', Wray 2992, Ridl. 5538, B. & H. 12685, 12982; flr. March, fruit March, June, Sept. An epiphyte, endemic, 4f, 5g.

Fagraea obovata, *Wall.* 300-4400', Wray 4181, Kunstl. 7578, B. & H. 12585; flr. April, fruit March, June. An epiphytic shrub of Indo-Malaya; in Peninsula common.

Fagraea pauciflora, *Ridl.* 200-500', Wray 1960, Kunstl. 1926, 3242, H. & N. 2400, Hend. 10218; flr. Feb. May, June, fruit Aug., Nov. A shrub of Sumatra and Borneo; in Peninsula 6e, 8j, 9m.

Fagraea racemosa, *Jack.* 200-500', Kunstl. 3188, Hend. 10046; fruit Jan., Aug. A bush or small tree of Borneo; in Peninsula common.

Fagraea vaginata, *King and Gamble.* 300-4000', Kunstl. 3863, 4044, 4238, Hervey; flr. Feb., May, fruit March. A large shrub or small tree of Java; in Peninsula 4f, 5h, 6k.

Strychnos flavescens, *King and Gamble.* Larut, Kunstl., fide Ridl. A liane, endemic, 2d, 6k.

Strychnos penicillata, *A. W. Hill.* At about 300', Scott. 1485, Ridl. 3006, Forest Dept. C. F. 1154; fruit Nov. A liane, endemic, 2d, 3d, 4e, 6j.

Strychnos pubescens, *Clarke*. At 300', H. & N. 2401 (a large-leaved variety). A liane of Indo-China, Sumatra and Borneo; in Peninsula 4f, 6j, 6k, 9m.

Strychnos Scortechinii, *A. W. Hill*. Larut, Kunstl., fide Ridl. A liane, endemic, 4f, 5h, 6k.

Gaertnera oblanceolata, *King and Gamble*. 3000-1700', Ridl., Anders. 19, B. & H. 12898, 12902; fr. Feb., March, fruit March. A shrub, endemic and local.

CONVOLVULACEAE.

Erycibe aenea, *Prain*. 300-2500', Kunstl., fide Ridl. A liane, endemic and local.

Erycibe festiva, *Prain*. 500-800', Kunstl. 6445; fr. Aug. A liane, endemic, 6k, 9m.

Erycibe glomerata, *Bl.* 800-3000', Wray 2580 (var. *longifolia*), Curt. 1283, Ridl. 2989 (var. *typica*); fr. Feb., Dec. A shrub or small tree of Java and Borneo; in Peninsula 1b, 4f.

Erycibe Griffithii, *Clarke*. Larut, Kunstl., fide Ridl. A liane of Tenasserim, Sumatra, Moluccas, and Philippines; in Peninsula 2d, 6k, 9m.

Erycibe magnifica, *Prain*. 500-1000', Kunstl. 3454; fr. Oct. A liane, endemic and local.

Erycibe malaccensis, *Clarke*. 300-800', Kunstl. 3180, 3575; fr. Aug., Nov. A climber, endemic, 2d, 6k.

Erycibe praecipua, *Prain*. Larut, Kunstl., fide Ridl. A liane, endemic, 2d.

Erycibe Stapfiana, *Prain*. 300-4000', Kunstl. 4015, 4115; fr. March, April. A liane of Tenasserim; in Peninsula 4d, 4f, 5g.

Erycibe strigosa, *Prain*. 500-800', Kunstl. 8461; fr. Feb. A liane, endemic and local.

Lettsomia Curtisii, *Prain*. At about 4500', Anders. 63; fruit March. A climber, endemic, 5h.

Lettsomia Kunstleri, *Prain*. At Waterloo Estate, Ridl.; fruit March. A climber of Sumatra; in Peninsula 3d, 4f, 6f, 5g, 5h, 6j, 6k.

Lettsomia penangiana, *Miq.* 100-4000', Wray 2334, Kunstl. 2048, 2574, Curt. 2034, Anders. 90, Derry; fr. March, June, July, Sept., fruit Nov. A slender climber, endemic, 2d, 5g.

Lettsomia Scortechinii, *Prain*. 3800-4400', Fox 180, Ridl. 5559, Hervey, B. & H. 12943; fr. Feb., fruit March Oct. A slender climber, endemic and local.

Hewittia bicolor, *Wight*. Larut, Scott., fide Ridl. A twiner of Trop. Africa and Indo-Australia; in Peninsula 6k.

Merremia caespitosa, *Hallier*. Larut, Kunstl., fide Ridl. A slender twiner of Indo-Australia; in Peninsula common.

Merremia convolvulacea, *Dennst.* At Larut, Ridl. (not seen). A slender twiner of Trop. Africa and Indo-Australia; in Peninsula a common weed.

Merremia hastata, *Hallier*. 100-500', Hend. 10050, 10083, 10233; flr. Jan., Nov. A sprawler of Trop. Africa and Indo-Australia; in Peninsula common.

Merremia umbellata, *Hallier*. At Taiping, Ridl.; flr. Feb. A long twiner, pantropic; in Peninsula common.

Merremia vitifolia, *Hallier*. Larut, Seortl., fide Ridl. A sprawler of S. E. Asia; in Peninsula 2b, 6c, 6d, 8g.

Ipomoea rubro-coerulea, *Hook.* At 3500', B. & H. A twining herb of Mexico; running wild here.

Ipomoea staphylina, *R. & S.* var. *malayana*, *Prain*. 100-500', Kunstl. 2538, 5091; flr. Oct., Nov. A shrubby climber of Sumatra; in Peninsula 2b, 2d, 6e.

SOLANACEAE.

Solanum aculeatissimum, *Jacq.* At 3300', B. & H. 13002; fruit March. ? Cultivated. A prickly shrublet of Lower Siam to Java; in Peninsula usually on seashores and sandy places.

Solanum Blumei, *Nees*. 1800-4400', Kunstl. 2234, Curt. 2035, Fox 126, Ridl.; flr. Aug.-Oct., fruit Sept. A shrub of W. Malaysia; in Peninsula 4e, 4f, 5g, 5h, 9l.

Solanum verbascifolium, *Linn.* 500-3500', Kunstl. 2069, B. & H.; flr. July. A shrub up to 8', pantropic; in Peninsula 2c, 2d, 6d, 5g, 7g, 5h, 9m.

Datura suaveolens, *Humb. and Bonpl.* At 3800', B. & H. A Mexican herb; running wild here.

SCROPHULARIACEAE.

Wightia borneensis, *Hook. fil.* 2000-3000', Derry; flr. Oct. A liane, eventually a tree, of Java and Borneo; in Peninsula 3e only.

Limnophila villosa, *Bl.* At Taiping, Wray, fide Ridl. A small aromatic herb of Sumatra and Java; in Peninsula common in damp places.

Vandellia crustacea, *Benth.* 100-500', Hend. 10322, B. & H.; flr. and fruit Feb., Aug. A cosmopolitan weed; in Peninsula common.

Torenia atropurpurea, *Ridl.* 4000-4750', Ridl. 5507, B. & H. 12735; flr. March, June. A creeping herb, endemic, 4f, 5g.

Bonnaya veronicaefolia, *Spreng.* var. *grandifolia*, *Hook. fil.* At Taiping, Wray, fide Ridl. An erect herb, the species of S. E. Asia; in Peninsula the var. at 2b, 6b, 5g, 6k.

Striga hirsuta, *Benth.* At Taiping, Ridley's collector. A small herb of Indo-Malaya; in Peninsula common in grass.

Scoparia dulcis, *Linn.* 3500-4000', B. & H. A woody herb of American origin; in Peninsula a common weed.

LENTIBULARIACEAE.

Utricularia minutissima, *Vahl.* Larut, Kunstl., fide Ridl. A minute herb, endemic, 8g, 8j, 6k, 7k.

GESNERACEAE.

Aeschynanthus Hildebrandtii, *Hemsl.* 4000-4100', Ridl., H. & N. 2347; flr. Feb., June, fruit Feb. A creeping epiphyte of Burma; in Peninsula 6g.

Aeschynanthus obcorica, *Clarke.* 2000-3200', Kunstl. 2849, Curt. 2990 (Batu Kurau), B. & H. 12798; flr. March, Oct., Dec. An epiphytic creeper of Borneo; in Peninsula 4d, 3f, 4f, 4h, 5h.

Aeschynanthus parvifolia, *R. Br.* 2000-4500', all collectors; flr. Feb., March, Sept., Oct., Dec. An epiphytic creeper of W. Malaysia; in Peninsula common.

Aeschynanthus perakensis, *Ridl.* 2000-4500', Kunstl. 3641, 7022, Curt., Ridl. 11447, Anders. 95; flr. March, Sept., Dec., fruit Dec. A small shrub, endemic, 4e, 4f.

Aeschynanthus purpurascens, *Hassk.* At 2000', Ridl., fruit June. An epiphyte of W. Malaysia; in Peninsula 6d, 4f, 5h, 7l, 9m.

Aeschynanthus rhododendron, *Ridl.* 300-4750', all collectors; flr. Feb.-April, Sept., Oct., Dec., fruit July, Oct. A small erect shrub, endemic, 1e.

Agalmyla staminea, *Bl.* 1000-4000', all collectors; flr. Feb., Sept., Oct., fruit Sept., Dec. A creeper on trees, of W. Malaysia; in Peninsula 4e, 5g.

Didissandra frutescens, *Clarke.* 300-3000', Wray 1723, Curt., Ridl. 2912, Hend. 10449; flr. and fruit Feb., Dec. A small shrub of Sumatra; in Peninsula 2d, 4e, 3f, 4f, 6k.

Didissandra quercifolia, *Ridl.* 2000-4200', all collectors; flr. Feb., March, May, Aug., Sept. A woody stemmed herb, endemic and local.

Didymocarpus albomarginata, *Hemsl.* 200-4400', all collectors; flr. Jan., Feb., June, Sept., fruit Jan., June, Oct. A herb, endemic, 5h.

Didymocarpus alternans, *Ridl.* 500-3000', Kunsth. 2311, Curt.; fr. Dec., fruit Sept., Dec. A herb, endemic, 4f.

Didymocarpus corchorifolia, *R. Br.* G. Hijau, Scort. 1266, fide *Ridl.* A small shrub, endemic, 2d, 4f, 6j, 8l. *Ridley* in his *Flora* says "Taiping Hills, all collectors," but there is no specimen from Taiping Hills in *Herb. Singap.*

Didymocarpus crinita, *Jack.* 3000-4000', all collectors; fr. Feb., March, Aug., Sept. A herb of Sumatra and Borneo; in Peninsula common.

Didymocarpus flava, *Ridl.* 2000-4200', all collectors; fr. Jan.-March, Aug., Sept., Dec. A woody herb of Lower Siam; in Peninsula 4f.

Didymocarpus hirsuta, *Ridl.* Larut Hills, Kunsth., fide *Ridl.* A woody herb, endemic, 4f.

Didymocarpus hispida, *Ridl.* 3700-4600', Kunsth. 2417, 8429, Curt. 2037, *Ridl.*, *Anders.* 32, *Harvey*, B. & H. 12594, 12667, 12749, 12751, 12876, 12879; fr. Jan., Feb., March, Sept., fruit Sept. A herb, endemic, 4d, 4e, 4f, 5g.

Didymocarpus malayana, *Hook. fil.* 500-3000', Curt. 2039, *Haniff* 13136; fr. Sept., fruit March. A shrublet, endemic. 4e, 4f, 5g, 5h.

Didymocarpus parviflora, *Ridl.* At 4000', Curt., fide *Ridl.* A woody herb, endemic, 6j.

Didymocarpus reptans, *Jack.* var. *monticola*, *Ridl.* 200-4000', all collectors; fr. Jan., March, June, July, Sept., fruit March, Oct. A creeping herb of Sumatra and Java; in Peninsula the var. at 3f, 4f, 5g, 5h, 6j, the species at 2d, 5g, 5h.

Didymocarpus serratifolia, *Ridl.* At 1000', *Ridl.* 11922 (not seen). A woody herb, endemic and apparently also from 7g.

Didymocarpus sulphurea, *Ridl.* G. Hijau, Scort. 6a; fruit Aug. A woody herb, endemic, 4e, 4f, 5g.

Didymocarpus urticaefolia, *Ridl.* Up to 4000', Curt., fide *Ridl.* A herb, endemic, 4d.

Chirita caliginosa, *Clarke.* At Batu Kurau, Scort. 1582; fruit Dec. A soft herb on limestone, endemic, 4d, 4e, 4f, 5h.

Chirita elata, *Ridl.* 3000-4000', Curt. 2038, *Ridl.* 2911, H. & N. 2353, *Hend.* 10109, B. & H. 12566, 12990; fr. Feb., March, Sept., Oct., fruit Jan. A rough herb, endemic and local.

Chirita Glasgovii, *Ridl.* At Waterloo, Robertson-Glasgow; fr. and fruit Dec. A weak herb, endemic and local.

Loxocarpus caerulea, *Ridl.* 4000-4700', Scort. 1427, Kunsth. 6990, *Ridl.*, *Anders.* 3, B. & H. 12881; fr. Feb., March, Oct., Dec. A stemless herb, endemic, 3d, 6e, 4f, 5h.

Paraboea capitata, *Ridl.*, var. *oblongifolia*, *Ridl.* At Batu Kurau, Scort. 1581; fruit Dec. A stemless herb on limestone, endemic, the species at 4f, 5h, the var. at 4e, 4f.

Paraboea cordata, *Ridl.* 2300-4500', all collectors; flr. Feb., March, July, Aug., Oct. A tall herb, endemic, 2c, 2d, 4d, 7k.

Boea paniculata, *Ridl.* At Batu Kurau, Scort. 1611; fruit Dec. A shrublet up to 1', on limestone, endemic, 4e, 5h.

Rhynchoglossum obliquum, *Bl.* At about 4000', Fox; flr. and fruit Oct. A succulent herb of S. E. Asia; in Peninsula 4f.

Epithema saxatile, *Bl.* At Batu Kurau, Scort. 1580; flr. Dec. A herb of W. Malaysia; in Peninsula 1b, 2d, 4e, 4f, 6g, 5h.

Monophyllaea Horsfieldii, *R. Br.* At Batu Kurau, Scort. 1579; flr. Dec. A succulent herb, usually on limestone, of Sumatra and Java; in Peninsula 4b, 4e, 4f, 5h.

Monophyllaea patens, *Ridl.* At Batu Kurau, Scort., fide *Ridl.* A succulent herb on limestone, endemic, 4e 4f, 5h.

Staurotheca grandiflora, *Benth.* 1000-1500', *Kunstl.* 2248; flr. Aug. A succulent herb of Burma; in Peninsula 2d, 6e, 4f.

Rhynchotecom parviflorum, *Bl.* 1500-2000', *Kunstl.* 2237, *Ridl.*; flr. Aug., fruit Dec. A small shrub of Sumatra and Java; in Peninsula 2d, 6d, 6e, 4f.

Cyrtandromoea acuminata, *Benth. and Hook.* 100-2000', all collectors; flr. Jan., April, June, Aug., Dec. A small weak shrub of Sumatra; in Peninsula common in the North.

Cyrtandromoea megaphylla, *Hemsl.* Waterfall Hill, Wray 43. A bush, endemic, 2c, 4f, 5g, 5h.

Cyrtandra cupulata, *Ridl.* 300-3000', Scort. 366, *Kunstl.* 1940, 2057; flr. April, June, fruit July. A shrub, endemic and common.

Cyrtandra dispar, *DC.* 100-4000', Scort. 367, *Kunstl.* 2052, 3891, 5131, *Ridl.*, *Anders.* 124, B. & H. 13013; flr. March, April, fruit Feb., July, Nov. A small shrub, endemic, 2d, 4f.

Cyrtandra pendula, *Bl.* At 2000', Curt. 2036; flr. Sept. A woody herb of Sumatra and Java; in Peninsula, Taiping to Singapore.

Cyrtandra pilosa, *Bl.* 100-4000', all collectors; flr. Jan.-March, June, Oct., fruit March. A small shrub of Malaysia; in Peninsula common.

BIGNONIACEAE.

Pajanelia multijuga, *DC.* At base of Taiping Hill, Hend. 10388, Cubitt's coll. C.F.947; flr. Jan., Dec., fruit Dec. A tree up to 80', endemic, 2d, 4d. Ridley's specimen from Kranji, Singapore is not this.

Radermachera amoena, *Seem.* At Taiping, Wray, Scort. 1496; fruit Nov. A tree up to 80', of Indo-Malaya; in Peninsula 2h, 5h, 6k, 9m.

Radermachera stricta, *Zoll. and Mor.* At 200', Wray 2143; fruit June. A tree up to 30', of Indo-Malaya; in Peninsula 2d, 4d, 6e, 4f, 5h, 6j, 6k.

PEDALINACEAE.

Sesamum indicum, *DC.* At Taiping, Hend. 10092; fl. and fruit Jan. An erect herb, cultivated in all tropics.

ACANTHACEAE.

Thunbergia fragrans, *Roxb.* At about 3800', B. & H. A sprawler of India; probably an escape from cultivation here.

Staurogyne arcuata, *Clarke.* 2000-4500', Wray 694, Curt., Ridl. 2892; fl. June, fruit Feb., Sept. A creeping ascending herb, endemic, 4d, 4f.

Staurogyne lasiobotrys, *Kuntze.* Up to 4500', Curt. 1350 (Waterloo), Ridl.; fl. Dec., fruit March. A small shrub of Burma; in Peninsula 1b, 6c, 4d, 5h, 5j, 0j.

Staurogyne macrantha, *Clarke.* 4500' and upwards, Kunstl., fide Ridl. A herbaceous shrublet, endemic and local.

Staurogyne pauper, *Clarke.* At 200', Kunstl., fide Ridl. An erect herb, endemic and local.

Staurogyne setigera, *Kuntze.* At 300', Ridl. 14431; fl. Aug. A creeping herb of W. Malaysia; in Peninsula common.

Staurogyne subglabra, *Clarke.* 3600-4500', Curt., Ridl., Hervey. II. & N. 2340, B. & H. 12872; fl. Feb., Dec., fruit Dec. An erect herb of Borneo; in Peninsula 2c, 4f, 5h.

Strobilanthes bibracteatus, *Bl.* 4000-4700', Ridl. 5516, Anders. 2, Kloss, B. & H. 12899; fl. Feb., May, June, fruit March. An undershrub of Sumatra and Java; in Peninsula 3e only.

Strobilanthes collinus, *Nees.* At about 4500', Ridl.; fl. and fruit March. A big herb or shrub, endemic, 1b, 2d, 6d.

Strobilanthes flaccidifolius, *Nees.* At Batu Kurau, Haniff 13255. A herb, cultivated for blue dye in Upper Perak and Kelantan; native of Indo-China and S. China.

Strobilanthes hirtisepalus, *Clarke.* Taiping Hills, Kunstl., fide Ridl. An undershrub, endemic, 2c, 4f, 5g, 5h.

Strobilanthes Maingayi, *Clarke.* At Maxwell's Hill, Kloss. An undershrub up to 3', endemic, 1b, 2d, 5g, 5h.

Strobilanthes rufo-pauper, *Clarke*. 3000-4500', Ridl. 5515, Hervey, Curt., Anders. 26, B. & H. 12974; flr. March, Sept. A creeping herb, endemic, 4f.

Strobilanthes rufo-sepalus, *Clarke*. Taiping Hills, Ridl.; flr. Dec. A herb, endemic, 2d, 4d, 2le, 5g.

Phlogacanthus brevis, *Clarke*. At 300', Kunstl., fide Ridl. An undershrub, endemic and local.

Gymnostachyum magis-nervatum, *Clarke*. Larut, Kunstl., fide Ridl. A herb, endemic and local.

Pseuderanthemum caudifolium, *Ridl.* At Taiping, Scott. 1531. Curt.; flr. Sept., Nov. A shrub up to 5', of Lower Siam; in Peninsula 3f, 4f.

Gendarussa vulgaris, *Nees*. At 300', Hend. 10317; flr. Aug. A bush of S. E. Asia; in Peninsula common in or near cultivation.

Justicia Clarkeana, *Ridl.* 3000-3200', Kunstl., fide Ridl. A tall herb, endemic and local.

Justicia Maingayi, *Clarke*. At Taiping, Ridl. 14432, Anders. 93; flr. March, Aug., fruit Aug. A slender shrub, endemic, 2d.

Justicia ptychostoma, *Nees*, var. *auriculata*, *Clarke*. At Taiping, Kunstl., fide Ridl. A herb, endemic, the species common, the var. at 4e, 3f.

Justicia pubiflora, *Clarke*. 4000-4700', Ridl., Anders. 11, B. & H. 12863; flr. Feb., March, Dec. A herb, endemic, 8l, 8m.

Justicia Scortechinii, *Clarke*. At 3000', Scott., fide Ridl. A herb, endemic and local.

Peristrophe acuminata, *Linn.* At Batu Kurau, Paniff 10553; flr. May. A herb up to 3', of Indo-Malaya; in Peninsula common.

VERBENACEAE.

Lantana aculeata, *Linn.* At Taiping and at 3800', Hend., B. & H. A prickly bush, pantropic, of S. American origin; in Peninsula common in waste ground.

Stachytarpheta jamaicensis, *Vahl*. At Taiping, Hend. 10034; flr. all the year. A small shrub, pantropic, of S. American origin; in Peninsula common.

Callicarpa angustifolia, *King and Gamble*. At Batu Kurau, Scott., fide Ridl. A shrub on limestone, endemic, 1b, 4e, 5h.

Callicarpa arborea, *Roxb.* At 200', Hend. 10037; flr. Jan. A tree up to 60', of Indo-Malaya; in Peninsula 6b, 2c, 2d, 3f, 6g, 6j.

Callicarpa cana, *Linn.* At Taiping, Ridl. (not seen). A shrub of Malaysia to Australia; in Peninsula 2h, 2d, 7g, 5j, 6k.

Premna Derryana, *King and Gamble*. At 3700', Derry, B. & H. 12972; fr. March. A climbing shrub, endemic and local.

Premna sterculifolia, *King and Gamble*. At 300', Wray, Kunstl. fide Ridl. A shrubby climber, endemic and local.

Gmelina villosa, *Roxb.* At Changkat Serdang. Wray, fide Ridl. A shrub or small tree, of Indo-Malaya to the Philippines; in Peninsula common.

Clerodendron deflexum, *Wall.* At 700', Hend. 10004, 10426; fr. and fruit Jan., Oct. A small shrub of Pulau Battam; in Peninsula common.

Clerodendron disparifolium, *Bl.* 100-3000', Curt. 2043, Hend. 10303, B. & H.; fr. Aug., fruit Aug., Sept. A tree up to 20', of W. Malaysia; in Peninsula common.

Clerodendron myrmecophilum, *Ridl.* 100-1080', Ridl. Hend. 10035; fr. Jan., Aug. A shrublet, endemic, 8d, 9l, 8m, 9m.

Clerodendron paniculatum, *Linn.* 300-800', Kunstl. 6437, fide King and Gamble. A tall shrub of Java; in Peninsula 2c, 2d, 4f, 5g, 5h, 6j, and sometimes cultivated.

Clerodendron penduliflorum, *Wall.* At Batu Kurau, Scort., fide Ridl. A small shrub of Burma and Tenasserim; in Peninsula 4b, 2c, 2d, 6d, 5h.

Clerodendron Ridleyi, *King and Gamble*. Larut, Kunstl., fide Ridl. A shrub or small tree of Borneo; in Peninsula 5h.

Clerodendron serratum, *Spreng.* var. *Wallichii*, *Clarke*. Taiping, Scort. 107, fide King and Gamble. A bushy shrub of Indo-Malaya; in Peninsula 6c, 4e, 6e, 4f, 5g, 5h.

Clerodendron umbratile, *King and Gamble*. At 3000', Derry (Curt. 3704); fr. Sept. A shrub of Sumatra; in Peninsula 4f, 5h, 6k.

Vitex coriacea, *Clarke*. At 1000', Wray 2225, fide King and Gamble. A tree, endemic, 2c, 4f, 6k, 9m.

Vitex gamosepala, *Griff.* 500-1000', Scort. 445, 1480, Kunstl. 1841, fide King and Gamble. A small tree of Sumatra and Borneo; in Peninsula 5g, 8g, 5h, 6k, 9m.

Vitex heterophylla, *Roxb.* Up to 1000'. Kunstl., fide King and Gamble. A tree up to 80', of Indo-Malaya; in Peninsula 4f.

Vitex longisepala, *King and Gamble*. 500-2000', Curt., Ridl. 2984, Anders. 104, Cubitt C. F. 1152, Hend. 10019, 10479; fr. Feb., March, Oct., fruit Jan., May. A tree, endemic, Penang to Malacca.

Vitex peralata, *King*. Larut, on low ground, Kunstl. 2064, 6187, 6874, 8299, fide King and Gamble. A spreading tree, endemic. Taiping to Singapore.

Vitex pteropoda, *Miq.* Larut, on low ground, Kun-*tl.* 5249, 6668, fide King and Gamble. A spreading tree of Sumatra; in Peninsula 8h, 9m.

Vitex pubescens, *Vahl.* At about 200', Hend. 10209, Haniff 13271 (Batu Kurau); fruit May, Sept. A bushy tree of Indo-Malaya to the Philippines; in Peninsula common.

Vitex siamica, *Williams.* At Batu Kurau, Scott. 1618, fide King and Gamble. A tree, on limestone, endemic, 1h, 5h.

Sphenodesme triflora, *Wight.* At Taiping, Wray, Kun*stl.*, fide Ridl. A climber or erect shrub of Sumatra and ?Borneo; in Peninsula common.

LABIATAE.

Hyptis brevipes, *Poit.* At Taiping, Wray 3051; fr. Sept. A herb up to 3', pantropic, of S. American origin; in Peninsula common.

Hyptis suaveolens, *Poit.* At Taiping, Hend. 10324; fr. Aug. A herb of Trop. America and S. E. Asia; in Peninsula common.

Coleus atropurpureus, *Benth.* At Taiping, Hend. 10107; fr. Jan. A small herb of Malaysia; in Peninsula common.

Dysophylla auricularia, *Bl.* At Taiping, Wray, fide Ridl. A herb up to 3', of S. E. Asia; in Peninsula common.

Calamintha gracilis, *Benth.* Up to 3400', Ridl. 11912, Anders. 89, B. & II. 12812; fr. Feb., March. A slender creeper of Assam and Java; in Peninsula 3e only.

Leucas zeylanica, *R. Br.* At Taiping, Hend. 10160; fr. April. A herb of S. E. Asia; in Peninsula very common.

Paraphlomis rugosa, *Prain.* 500-3000', Scott. 339, Kun*stl.* 2372, Curt. 2726, Ridl. 2892, Anders. 112; fr. Sept., fruit March. A shrub of Indo-Malaya; in Peninsula 4f.

Gomphostemma crinitum, *Wall.* At about 200', Wray 3340, Hend. 10058; fr. Jan., Feb., fruit Jan. A woody herb of Tenasserim; in Peninsula common in hill forests.

Gomphostemma Curtisii, *Prain.* 2000-4300', Curt. 1310, Fox 173, Ridl.; fr. Feb.-March. Oct., fruit Dec. A woody herb, endemic, 2d, 4f, 5g.

Gomphostemma microcalyx, *Prain.* 1800-2000', Kun*stl.* 2155, fide King and Gamble, Ridl. A large herb of Borneo; in Peninsula 4f.

Gomphostemma Scortechinii, *Prain.* Up to 4500', Scott., Kun*stl.*, fide Ridl. A woody herb of Tenasserim; in Peninsula 6d.

AMARANTACEAE.

Deeringia celosioides, *Brown*. At Batu Kurau, Scert., fide Ridl. A sprawler on limestone, of Indo-Australia; in Peninsula 5h.

Deeringia indica, *Zoll.* At Waterloo, Curt. 2691; fr. and fruit May. A small shrub of W. Malaysia and Philippines; in Peninsula 2b, 4e, 4f, 6g, 5h.

Cyathula prostrata, *Bl.* At Taiping, Hend. A straggling herb, pantropic; in Peninsula common in open ground.

Psilotrichum trichotomum, *Bl.* At Maxwell's Hill, Ridl. Cultivated. A flaccid herb of Indo-Malaya to the Philippines; in Peninsula 1a, Ulu Kal, Perak.

Aerua Curtisii, *Oliv.* 500-1000', Waterloo, Curt.; fruit May. A straggling herb, endemic, 4d.

POLYGONACEAE.

Polygonum capitatum, *Ham.* At 4000', B. & H. 12961; fr. March. A herb of Himalaya, not previously recorded from the Peninsula. Doubtless introduced.

ARISTOLOCHACEAE.

Apama corymbosa, *Soler.* 100-3000', Kunstl. 2875, Curt. 2045. H. & N. 2301, Hend. 10010; fr. Jan.-March, Sept., fruit Jan., March. A shrub of Sumatra; in Peninsula, Penang to Malacca.

Thottea dependens, *Klotzsch.* 300-1000', Ridl., B. & H.; fr. March. A shrub, endemic, 2d, 3f, 4f, 7k, 9m.

Aristolochia minutiflora, *Ridl.* 100-3300', Kunstl., fide Ridl. (the species), Wray 2997, Kunstl., fide Gamble (var. *dolobrata*). A slender climber, endemic, 3f, the var. at 3e only.

CYTINACEAE.

Rafflesia Hasseltii, *Suringar.* Taiping Hill, Cantley, Wray, fide Ridl. A parasite of Sumatra; in Peninsula 4d.

NEPENTHACEAE.

Nepenthes ampullaria, *Jack.* At 100'. Kunstl. 1943; fr. June. A climber of Malaysia; in Peninsula 2d, 4e, 8g, 5h, 6k, 9l, 9m.

Nepenthes gracilis, *Korth.* 100-300', Kunstl., 1941, 4019, 4025. Hend. 10050; fr. March. A slender climber of W. Malaysia; in Peninsula common in low country.

Nepenthes Raflesiana, Jack. At 4400', Fox 182, Derry; fr. and fruit Oct. A climber of Sumatra and Borneo; in Peninsula 5g, 8h, 6k, 7k, 8l, 9l, 9m.

Nepenthes sanguinea, Lindl. 4400-4750', Wray, Kunstl. 3316. Curt. 2044, Fox 183, Ridl., Derry, Anders. 62, B. & H. A climber of Borneo; in Peninsula 6e, 4f, 5g, 6g, 5h, 7k.

PIPERACEAE.

Peperomia Maxwelliana, C. DC. At about 2500', Ridl. 5481; fr. June. A small herb, endemic and local.

Piper acre, Bl. 1000-4000', Curt., fide Ridl. A slender climber of Java; in Peninsula 3e only.

Piper Betle, Linn. At 1500', Waterloo, Curt. 2701; fruit May. Sirih. A climber extensively cultivated in S. E. Asia.

Piper boehmeriaefolium, Wall. 500-1500', Kunstl. 2231, 2257, fide C. de Candolle. An erect shrub of E. Himalaya to Siam; in Peninsula 4d, 6g, 5j.

Piper Curtisii, C. DC. At about 2000', Curt. 2699, Ridl.; fruit May. A slender creeper, endemic, 4d, 5h, 6k, 9l.

Piper eucolyptolimbum, C. DC. 2800-3000', Kunstl. 3228, fide C. de Candolle. A climber, endemic and local.

Piper filipes, C. DC. 3200-3500', Kunstl. 3122, fide C. de Candolle. A creeper, endemic and local.

Piper flavimarginatum, C. DC. Taiping Hills, Ridl.; fruit Feb. A climber, endemic, 6f, 9m.

Piper gymnocladum, C. DC. At about 2500', Ridl. 5479; fr. June, fruit June, Dec. A climber, endemic and local.

Piper kotanum, C. DC. At Kota, Wray 1947, fide C. de Candolle. A climber?, endemic and local.

Piper larutanum, C. DC. Larut, Kunstl. 3327; fr. and fruit Sept., fide C. de Candolle. A climber on trees, endemic and local.

Piper longamentum, C. DC. 1800-3000', Kunstl. 32071 (?); fr. Aug., fide C. de Candolle. A climber?, endemic and local. Kunster's number as quoted by de Candolle is almost certainly a mistake.

Piper longibracteum, C. DC. At 3000', Wray 101. A long climber, endemic, 4d.

Piper magnibaccum, C. DC. 3900-4000', Curt. 2046, Ridl. 5480, Anders. 158, B. & H. 13012; fr. and fruit March, Sept. A climber, endemic, 4e, 4f, 5g.

Piper Maxwellianum, C. DC. At 2500', Wray 1734. A climber, endemic and local.

Piper miniatum, *Bl.* 100-4000', *Curt.*, *Ridl.* 2962, *Anders.* 82; flr. March, Oct. A climber of Java: in Peninsula common.

Piper minutistigmum, *C. DC.* Larut, *Kunstl.* 2388; flr. and fruit Sept., fide *C. de Candolle*. A large climber, endemic and local.

Piper muricatum, *Bl.* 200-1000', *Wray* 2076, *Ridl.* *Hend.* 10001, 10060; fruit Jan., March. A herb of W. Malaysia; in Peninsula common.

Piper nigrum, *Linn.* At Waterloo, *Curt.* 2700; fruit May. Black pepper, cultivated, a native of S. India.

Piper penangense, *C. DC.* 3000-4700', *Ridl.*, *Anders.* 72, *B. & H.* 12668, 12897; flr. Feb., March, fruit Feb. A small shrub, endemic, 2d, 3d, 4d.

Piper porphyrophyllum, *N. E. Br.* 200-4500', *Curt.* 2048, *Haniff* 10552, *Hend.* 10003, 10069; flr. Sept., fruit Jan. A climber of Borneo; in Peninsula common.

Piper ramipilum, *C. DC.* Larut, *Kunstl.*, fide *C. de Candolle*. A creeper up to 20', endemic, 2d, 4d, 4f, 6k, 7l, 9m.

Piper ribesioides, *Wall.* 200-1000', *Wray* 2184, 4244, *Kunstl.*, fide *C. de Candolle*. A creeper on trees, of Tenasserim and Sumatra; in Peninsula common.

Piper Ridleyi, *C. DC.* 300-4500', *Curt.* 2047, *Ridl.* 14503, *Anders.* 147, *B. & H.* 12693; flr. March, Aug., Sept., fruit March, May, Aug. An erect shrub, endemic, 4d, 4f, 5g, 4h, 9m.

Piper Scortechinii, *C. DC.* 2800-3000', *Scort.* 285, *Kunstl.* 3230, fide *C. de Candolle*. A slender climber, endemic, 4f.

Piper semangkoanum, *C. DC.* At 4000', *Ridl.* An erect shrublet, endemic, 5g.

Piper stylosum, *Miq.* 200-4700', *Wray* 8, *Curt.* 2049, *Ridl.*, *Anders.* 37, *B. & H.* 12874, *Haniff* 13281; flr. Feb., May, fruit March, Sept. A small erect shrub of Sumatra and Borneo; in Peninsula common.

Piper umbellatum, *Linn.* At Waterloo, 1500', *Curt.* 2698; fruit May. An erect shrub, pantropic; in Peninsula 2d, 6d, 6f, 5g, 5h, 6j.

Piper velutinervium, *C. DC.* 1800-2000', *Kunstl.* 2193, 2196; flr. and fruit Aug., fide *C. de Candolle*. An erect? pepper of Sumatra; in Peninsula 3e only.

CHLORANTHACEAE.

Chloranthus officinalis, *Bl.* 3000-3700', *B. & H.*; fruit Feb. A shrub of Indo-Malaya; in Peninsula common.

MYRISTICACEAE.

Horsfieldia brachiata, Warb. Larut, Kunstl., sive Ridl. A tree up to 60', endemic, 6k, 9m.

Horsfieldia fulva, Warb., var. *paludicola*, Warb. Larut, Kunstl., sive Ridl. A tree up to 60', endemic, the var. at 4f, 9m, the species at 4f, 6k.

Horsfieldia Irya, Warb. At 300', Kunstl. 7447; fr. April. A tree of Indo-Malaya; in Peninsula common.

Horsfieldia Lehmanniana, Warb. At Taiping, Wray 2088; fr. June. A tree up to 50', endemic, 4f, 5g, 6k, 9m.

Horsfieldia majuscula, Warb. At 2000', Wray 2218, Ridl. 11919; fr. Feb. A tree about 50', endemic, 2d, 4f, 9m.

Horsfieldia subglobosa, Warb. At 100', (up to 2000', sive Ridl.) Kunstl. 6672; fruit October. A tree up to 70', of Sumatra; in Peninsula 6k, 8l.

Horsfieldia sucosa, Warb. At 300', Kunstler 4078; fruit April. A tree up to 100', endemic, 2d, 4f, 6k, 9m.

Gymnacranthera Farquhariana, Warb. 100-3000', Wray, 2084, 2399, Kunstl. 5408, 6622, 6652, 7481; fr. April, Sept., fruit Jan., June, July, Sept. A tree up to 60', endemic and common.

Gymnacranthera Forbesii, Warb. 300-1000', Kunstl. 3783, 6591; fr. Sept., fruit Jan. A tree up to 80', of Sumatra; in Peninsula 2d, 3d, 4f, 6f, 6k, 9m.

Myristica cinnamomea, Warb. 500-1500', Wray 2056, Kunstl. 5170, 6440; fruit Nov. A tree up to 90', endemic and common.

Myristica crassa, King. At 2000', Wray 646. A tree up to 80', endemic, 4f, 6j, 6k, 9m.

Myristica elliptica, Wall. 200-400', Wray 1736, 2345; fr. and fruit April. A tree up to 80', of Sumatra and Borneo; in Peninsula common.

Myristica maxima, Warb. 300-800', Kunstl. 5513; fruit Feb. A tree up to 70', of Borneo; in Peninsula 2d, 9m.

Knema Cantleyi, Warb. At 100', Kunstl. 5614; fr. Feb. A tree up to 50', endemic, 2d, 5h, 9m.

Knema conferta, Warb. At Taiping, Wray 2377; fr. July. A tree up to 40', of Tenasserim, Siam and Borneo; in Peninsula common.

Knema Curtisii, Warb. Taiping Hill, Ridl. 14681; fruit Aug. A small tree, endemic, 2d, 6k, 9m.

Knema furfuracea, Warb. 800-1200', Kunstl. 5600; fr. Feb. A tree about 30', of Sumatra and Borneo; in Peninsula common.

Knema intermedia, *Warb.* At 100', Kunstl. 6371, 7576; fruit May, July. A tree up to 50', of W. Malaysia; in Peninsula common.

Knema Kunstleri, *Warb.* 500-3000', Wray 2056, Kunstl. 4150, 6440, Curt. 2051, Haniff 13127; flr. March, April, fruit June, Sept. A tree up to 20', endemic, 4f, 5h, 6k.

Knema laurina, *Warb.* At Waterloo, Curt. 2728; fruit May. A tree up to 60', of W. Malaysia; in Peninsula common.

Knema oblongifolia, *Warb.* Taiping Hills, Ridl. (not seen). At 3000', Curt. 2050 (var. *monticola*); fruit Sept. A shrub, endemic, the species common, the var. at 4f.

Knema Wrayi, *Warb.* At 100', Kunstl. 6521; fruit Aug. A tree up to 30', endemic, 4f, 5h, 6k, 7l, 9m.

MONIMIACEAE.

Matthea sancta, *Bl.* 2500-3000', Wray 2811, B. & H. 12826; flr. and fruit March. A shrub or tree of Borneo; in Peninsula, 8h, 6k, 7l, 9m.

LAURACEAE.

Cryptocarya crassinervia, *Miq.* 100-500' (to 3000', fide Gamble), Kunstl. 5729, 6579; flr. Sept., Nov. A tree up to 60', of Sumatra and Borneo; in Peninsula 3f, 4f, 5h.

Cryptocarya densiflora, *Bl.* 500-800', Kunstl. 3605. A tree up to 60', of Java, Borneo, Philippines; in Peninsula 5g.

Cryptocarya Kurzii, *Hook. fil.* 100-300', Kunstl. 5320, 5395; flr. Jan., fruit Dec. A tree up to 40', of Tenasserim to Borneo; in Peninsula 4f, 8j, 6k, 9l, 9m.

Cryptocarya rugulosa, *Hook. fil.* 500-1000', Kunstl. 3719, 6279; flr. Jan., fruit July. A tree up to 50', endemic, 2d, 3f, 6k.

Cryptocarya Scortechinii, *Gamble.* 100-4000', Kunstl. 6297, 6298, Ridl. 2966; flr. March, July. A tree up to 70', endemic, 4f, 5g.

Beilschmiedia Foxiana, *Gamble.* At about 4000', Fox (Ridl. 10705). A tree, endemic and local.

Beilschmiedia insignis, *Gamble.* At Taiping, Kunstl., fide Ridl. A tree up to 70', endemic and local.

Beilschmiedia Kunstleri, *Gamble.* On low ground, Kunstl. 6854, fide Gamble. A tree up to 100', endemic, 9m.

Beilschmiedia longipes, *Hook. fil.* 800-2000'. Kunstl. 5465. Ridl.; flr. Jan. A spreading tree up to 50', endemic, 6k.

Beilschmiedia perakensis, *Gamble*. 500-800', Kunstl. 8489; fr. Feb. A shrub or tree, endemic, 4f.

Beilschmiedia Scortechinii, *Gamble*. At 3700', Scort. 483, 193, fide Gamble. A tree, endemic and local.

Dehaasia cuneata, *Bl.* At Taiping, Wray 2099, 2654, 3101, Kunstl. 6145, fide Gamble. A tree up to 50', of Burma, Sumatra, Java; in Peninsula 1a, 3f, 5h.

Endiandra praeclara, *Gamble*. 100-4000', Kunstl. 6714, II. & N. 2320; fr. Feb., Oct., fruit Feb. A tree up to 70', endemic, 2d, 4f, 5h.

Cinnamomum cinereum, *Gamble*. 500-2000', Wray 2629, Kunstl. 8515, fide Gamble, Wray 4056; fr. April. A tree up to 70', endemic and local.

Cinnamomum graciliflorum, *Gamble*. At about 4500', Scort. 1228, fide Gamble. A tree, endemic, 4d.

Cinnamomum iners, *Reinw.* 100-800', Kunstl. 3861, 6456, 6510; fr. Aug., fruit Feb. A tree about 40', of Indo-Malaya to the Philippines; in Peninsula common.

Cinnamomum Kunstleri, *Ridl.* Within 100', Kunstl. 5568, fide Ridl. A tree up to 40', endemic and local.

Cinnamomum lampongum, *Miq.* Up to 800', Kunstl. 4802, 6595, fide Gamble. A tree of Sumatra; in Peninsula 3e only.

Cinnamomum mollissimum, *Hook. fil.* 100-800', Wray 2669, Kunstl. 6013, fide Gamble. A shrub or small tree, endemic, 2d, 4f.

Cinnamomum rhyncophyllum, *Miq.* Up to 500', Kunstl. 3287, fide Gamble. A tree up to 50', of Sumatra; in Peninsula 4f, 5g.

Alseodaphne insignis, *Gamble*. 800-1000', Kunstl. 6958, 7273; fruit Feb., Dec. A tree up to 100', endemic and local.

Alseodaphne paludosa, *Gamble*. Larut, Kunstl. 5378, fide Gamble. A tree up to 100', endemic and local.

Alseodaphne Wrayi, *Gamble*. At Kota, Wray 2543, at Larut, Kunstl. 5493, 5917, fide Gamble. A tree up to 50', endemic and local.

Nothaphoebe fruticosa, *Gamble*. At 2000', H. & N. 2389; fr. Feb. A shrub or small tree, endemic, 4f, 5h.

Nothaphoebe Kingiana, *Gamble*. 500-3500', Kunstl. 4938, II. & N. 2331; fr. Feb., Sept. A tree up to 40', endemic and local; a var. at 3f.

Nothaphoebe panduriformis, *Gamble*. At Changkat Serlang, Wray, fide Ridl. A tree up to 50', endemic, 4f, 6f, 5g, 8g, 8h, 6k.

Nothaphoebe reticulata, *Gamble*. At 4000', Ridl. 2967, B. & II. 12865; fr. Feb. A tree up to 50', endemic, 5g, 5h.

Nothaphoebe umbelliflora, *Bl.* 400-600', Kunstl. 8484; fr. Feb. A tree up to 50', of Siam to Borneo; in Peninsula common.

Machilus Scortechinii, *Gamble.* 3500-4000', Scott. 492, Kunstl. 8413, fide Gamble. A tree up to 50', endemic and local.

Phoebe cuneata, *Bl.* 100-1600', Kunstl. 2616, 6249, 6577, 6995, Ridl., II. & N. 2342; fr. Jan., Feb., Dec., fruit June, Sept. A tree up to 80', of Java; in Peninsula 2d, 4f, 5g, 5h, 7l, 9m.

Phoebe macrophylla, *Bl.* At Waterloo, Curt. 2727; fruit May. A bushy tree about 40', of Java; in Peninsula 3f, 9m.

Stemmatodaphne perakensis, *Gamble.* Up to 1000', Wray 2658, Kunstl., fide Gamble. A tree up to 70', endemic, 4f, 6k.

Actinodaphne glomerata, *Nees.* At Larut, Kunstl., fide Ridl. A tree up to 40', of Sumatra and Java; in Peninsula 9m.

Actinodaphne montana, *Gamble.* 3000-3500', Kunstl. 2129, 2913, fide Gamble. A tree up to 70', endemic and local.

Actinodaphne pruinosa, *Nees.* Waterfall Hill, Wray, fide Ridl. A tree up to 40', endemic, 2d, 6k, 9m.

Actinodaphne sesquipedalis, *Hook. fil.* 500-1200', Kunstl. 4399, 5147, Curt. 2053, Hendl. 11811; fr. March, June, Sept., Nov. A tree up to 50', of Lower Siam and Borneo; in Peninsula 2d 4f, 5h.

Litsea amara, *Bl.* At 2000', Ridl. 2981; fr. Feb. A bush or small tree of Indo-Malaya; in Peninsula common and variable.

Litsea angulata, *Bl.* At 4100', B. & H. 12866; fr. Feb. A tree up to 80', of Java; in Peninsula 5h.

Litsea brachystachya, *Boerl.* 800-1000', Kunstl. 6855; fr. Nov. A tree up to 50', of Java; in Peninsula 3e only.

Litsea castanea, *Hook. fil.* 500-1500', Kunstl. 4937, 6497; fr. Aug., Sept. A tree up to 100', endemic, 4f, 5h, 6k.

Litsea citrata, *Bl.* 3000-4000', Ridl. 11390, II. & N. 2323, B. & H. 12935, fr. Feb., Dec., fruit March. A small tree of Indo-Malaya and China; in Peninsula 4f, 5g.

Litsea claviflora, *Gamble.* 500-1000', Kunstl. 8492, fide Gamble. A tree up to 40', endemic and local.

Litsea cordata, *Hook. fil.* 100-200', Kunstl. 3962, 6529; fr. Sept., fruit March. A tree up to 30', of Sumatra and Borneo; in Peninsula 4f, 5h, 6k, 9l, 9m.

Litsea cylindrocarpa, *Gamble.* At 100', Kunstl. 5500, 6673; fr. Jan., fruit Oct. A tree up to 130', of Java and Borneo; in Peninsula 2d, 3f.

Litsea fenestrata, *Gamble.* Up to 800', Kunstl. 5938, 6859, fide Gamble. A tree up to 100', of Sumatra and Borneo; in Peninsula 3e only.

***Litsea ferruginea*, Bl.** 300-800', Kunstl. 6039, 6826; flr. May, fruit Nov. A tree up to 80', of Java; in Peninsula 4f, 9m.

***Litsea firma*, Hook. fil.** 400-500', Kunstl. 6772, 7391, fide Gamble. A tree up to 100', of W. Malaysia except Java; in Peninsula 6k, 9m.

***Litsea gracilipes*, Hook. fil.** At 100', Kunstl. 5421; fruit Jan. A small tree of Borneo; in Peninsula 8h, 6k, 9m.

***Litsea Griffithii*, Gamble.** Larut, Kunstl., fide Gamble. A tree up to 60', of Sumatra; in Peninsula 4f, 5h, 6k, 9l, 9m.

***Litsea hirsutissima*, Gamble.** 100-2500', Kunstl., Curt. 1344, fide Gamble. A shrub, endemic, 4f.

***Litsea lancifolia*, Hook. fil.** 200-500', Kunstl. 3233, 6609; flr. Aug., Sept. A bush or small tree of Indo-Malaya and China: in Peninsula 4f, 5h, 9l, 9m.

***Litsea machilifolia*, Gamble, var. *angustifolia*, Gamble.** At 100', Kunstl. 6815; fruit Nov. A tree up to 80', endemic, the var. at 4f, 5g, the species at 2d, 6k, 9m.

***Litsea megacarpa*, Gamble.** 100-500', Wray 2337, Kunstl. 6124, 6237, 6409, 6567, 6866; flr. May, June, fruit July, Sept., Nov. A tree up to 60', endemic 2d, 4f, 4h, 5h.

***Litsea monticola*, Gamble.** 3500-4500', Kunstl. 7000, 8454, fide Gamble. A tree up to 50', endemic and local.

***Litsea nidularis*, Gamble.** 800-1000', Kunstl. 6883; fruit Nov. A tree, endemic, 2d, Ulu Kenat, Perak.

***Litsea Noronhae*, Bl.** At Ulu Tupai, Wray, fide Gamble. A shrub or tree up to 50', of Sumatra and Java; in Peninsula 3f, 4f, 5h.

***Litsea oblanceolata*, Gamble.** Up to 300', Kunstl. 1952, 2020, fide Gamble. A tree up to 40', endemic and local.

***Litsea panamonja*, Hook. fil.** At Waterloo, 1500', Curt. 2694; flr. May. A tree up to 40', of Assam to Lower Siam; in Peninsula 5g, 6k.

***Litsea patellaris*, Gamble.** 400-800', Kunstl. 7312, fide Gamble. A tree up to 60', endemic and local.

***Litsea perakensis*, Gamble.** Up to 800'. Kunstl., fide Gamble. A tree up to 40', endemic, 4f, 9l, 9m.

***Litsea pustulata*, Gamble.** Up to 800', Kunstl. 2511, 3418, 5110, fide Gamble. A tree up to 30', endemic and local.

***Litsea spathacea*, Gamble.** Up to 3000', fide Gamble), Ridl. A small tree, endemic, 2d, 5h, 6j.

***Litsea Teysmanni*, Gamble.** At low altitudes, Wray, Kunstl., fide Ridl. A tree up to 70', of Bangka and Borneo; in Peninsula 6k.

Litsea Wrayi, *Gamble*. 800-1400', Wray 4036; flr. April. A tree up to 80', endemic and local.

Neolitsea villosa, *Gamble*. 4000-4500', Kunstl. 7011; fruit Dec. A tree up to 30', of Ambonia and the Philippine; in Peninsula 3c only.

Lindera bibracteata, *Boerl.* At 4500', II. & N. 2461; flr. Feb. A shrub up to 15', of Java; in Peninsula 4d, 4f.

Lindera caesia, *Boerl.* 3500-4000', Kunstl. 6951, Curt. 2052; flr. Sept., Dec. A small tree of Java and Borneo; in Peninsula 6e, 5g, 5h.

Lindera malaccensis, *Hook. fil.* 500-800', Kunstl. 5139; flr. Nov. A tree up to 80', of Sumatra and Borneo; in Peninsula 4f, 5g, 6k, 7l, 9m.

Lindera pipericarpa, *Boerl.* 3000-3500'. Seort., Kunstl., fide Ridl. A tree up to 40'. endemic, 4f, 5g.

HERNANDIACEAE.

Illigera appendiculata, *Bl.* At 3800', B. & II. 12561; flr. March. A climber up to 80', of Indo-Malaya; in Peninsula common.

PROTEACEAE.

Helicia attenuata, *Bl.* At 200', Hend. 10210; flr. Sept. A shrub or tree of Java; in Peninsula 2d, 6e, 4f, 5h, 9l.

Helicia excelsa, *Bl.*, var. *Forbesii*, *Ridl.* At low altitudes, Kunstl. 3392, fide Gamble. A tree up to 80', the species from Burma to Tenasserim, the var. in Sumatra and Cambodia; in Peninsula the var. in 3c only.

Helicia Kingiana, *Prain.* 500-1000', Kunstl. 3714, 3881, 6217. fide Gamble. A tree up to 70', endemic, 4f, 5g.

Helicia rufescens, *Prain.* 200-1500', Wray 2083, 3084, Kunstl. 4213, 4939, 5096, 8504, fide Gamble. A tree up to 80', endemic and local.

THYMELAEACEAE.

Daphne composita, *Gilg.* At about 4000', Wray 510. A shrub or small tree of Indo-Malaya; in Peninsula 4f, 5g, 5h.

Wikstroemia Candolleana, *Meissn.* 4000-4700', Curt. 2055 Ridl. 2900, Anders. 24, B. & H. 12658, 12965; flr. March, Sept. A shrub or small tree of Java; in Peninsula 3d, 4d, 6e, 4f, 5g, 6g.

Aquilaria malaccensis, *Lumk.* Larut, Kunstl., fide Ridl. A tree up to 80', of W. Malaysia to Philippines; in Peninsula common.

LORANTHACEAE.

Loranthus coccineus, *Jack.* 300-800', Wray 2582, Kunstl. 2323; flr. Sept. fruit July, Sept. A parasitic shrub of Indo-Malaya; in Peninsula common.

Loranthus crassipetalus, *King.* Larut Hills, Ridl. A parasitic shrub, endemic, 4f, 5h.

Loranthus ferrugineus, *Rorb.* At Taiping, Wray, Hendl. 10002; flr. Jan. A parasitic shrub of W. Malaysia to Philippines; in Peninsula common.

Loranthus grandifrons, *King.* At 100', Wray 1938, Kunstl. 2067; flr. May, July. A parasitic shrub of Lower Siam to Sumatra; in Peninsula 4f, 6f, 6g, 7g, 5j, 6k.

Loranthus heteranthus, *Wall.* 2500-3500', Wray 3234, Kunstl. 6362. A parasitic shrub of Indo-Malaya; in Peninsula 2c, 4d, 4f, 8g, 8j.

Loranthus Lobbii, *Hook. fil.* 2000-4500', Curt., Ridl. 2969, H. & N. 2384; flr. Feb., Sept. A parasitic shrub, endemic and common.

Loranthus malaccensis, *Hook. fil.* 3000-4000', Kunstl. 6286. A parasitic shrub, endemic and common.

Loranthus obtectus, *Wall.* 4300-4750', Fox 120, B. & H. 12670; flr. March, Oct. A parasitic shrub of Burma and Lower Siam; in Peninsula 4h, 6k, 9l.

Loranthus pentandrus, *Linn.* At about 1000', Wray 2062; flr. and fruit June. A parasitic shrub of Indo-Malaya and S. China; in Peninsula common.

Loranthus pentapetalus, *Rorb.* 4000-4750', Ridl. 2968, B. & H. 12891; flr. Feb. A parasitic shrub of Indo-Malaya and S. China; in Peninsula 4f, 5h, 8h, 6k.

Loranthus productus, *King.* 2500-3500', Wray 2949, H. & N. 2327; flr. Feb. A parasitic shrub, endemic, 4f, 5g.

Loranthus pulcher, *DC.* 3000-4000', Wray 3225, Kunstl. 6257, Fox 160, Ridl. 5231; flr. June, fruit Oct. A parasitic shrub of Tenasserim and Siam; in Peninsula 1a, 2d, 6e, 4f, 5g.

Elytranthe avenis, *G. Don.* At 4500'. Wray 645, fide Gamble. A parasitic shrub of Sumatra and Java; in Peninsula 2c, 6e, 4f, 6g.

Elytranthe diantha, *Gamble.* Up to 800', Scott. 76, 604, Kunstl. 1870, 6446, fide Gamble. A parasitic shrub, endemic and local.

Elytranthe formosa, *G. Don.* 3000-4000', Kunstl. 6264, Hervey. A parasitic shrub of Burma and Java; in Peninsula 4f, 5g, 7g, 5h.

Elytranthe Kunstleri, *Gamble.* At Taiping, Kunstl., fide Ridl. A bushy parasitic shrub of Borneo; in Peninsula 6e, 3f, 4f, 7g.

Lepeostegeres Beccarii, *Gamble*. At 3200', B. & H. 13029; flr. March. A creeping parasitic shrub of Borneo; in Peninsula 4f.

Lepeostegeres Kingii, *Gamble*. At about 4500', Scott. 1251, fide Gamble. A parasitic shrub, endemic, 6e, 4f, 5g, 6k, 9l.

Viscum dichotomum, *G. Don*. At 300', Kunstl. 4191. A parasite on other Loranthaceae, of India and Burma; in Peninsula common.

Viscum orientale, *Willd.* At 2000', Ridl. A bushy parasitic shrub of Indo-Australia and S. China; in Peninsula 2e, 2d, 4f, 8h, 6k, 9m.

SANTALACEAE.

Henslowia Reinwardtiana, *Bl.* At 100', Kunstl fide Ridl. A parasitic climber of W. Malaysia; in Peninsula 3e only.

Henslowia umbellata, *Bl.* 800-1000', Kunstl. 5213, fide Gamble. A climbing parasite of Siam and W. Malaysia; in Peninsula common.

Henslowia Wrayi, *Gamble*. 500-1000', Kunstl., fide Ridl. A climbing parasite, endemic and local.

OPILIACEAE.

Lepionurus sylvestris, *Bl.* 300-2500', Wray 2820, Kunstl. 5502, 8521, B. & H. 13032 (var.); flr. March. A small shrub of Siam, Java and Borneo; in Peninsula common.

BALANOPHORACEAE.

Balanophora ?multibrachiata, *Furcell.* 4200-4700', B. & H. A parasite of Sumatra; in Peninsula 4f, 5g, 6j, 9k.

Balanophora truncata, *Ridl.* At 3900', B. & H. 12527; flr. March. A parasite, endemic, 4f, 5g, 5h. This specimen differs from typical *B. truncata* in the flr.-spikes being purplish-grey and not dirty yellow.

Rhopalocnemis ruficeps, *Ridl.* 2500-4000', Ridl. (not seen). A fleshy parasitic herb, endemic, 2d.

EUPHORBIACEAE.

Euphorbia thymifolia, *Burm.* At Taiping, Wray, fide Ridl. A prostrate herb, pantropic; in Peninsula 2d, 8g, 6k, 9m.

Bridelia tomentosa, *Bl.* 100-500', Kunstl. 2492, 2676, Ridl. 2977, Hend. 10021, 10111, 10138, 10224; flr. Oct., Nov., fruit Jan., Feb. A small tree of Indo-Australia; in Peninsula common.

Cleistanthus ellipticus, *Hook. fil.* 100-500', Wray 2547, Kunstl. 3196, 5162; fr. July, Aug., fruit Nov. A tree up to 40', endemic, 2d.

Cleistanthus Kingii, *Jabl.* 300-500', Kunstl. 3064, 6744; fruit June, Oct. A shrub or tree up to 60', endemic, 4e.

Cleistanthus membranaceus, *Hook. fil.* 200-500', Kunstl. 1974, 3355, 3424, 6619; fr. June, Sept., Oct. A tree up to 30', endemic, 2d.

Cleistanthus pedicellatus, *Hook. fil.* At Taiping, Wray, fide Ridl. A small tree, endemic, 2d.

Cleistanthus podocarpus, *Hook. fil.* At 100', Kunstl. 6701; fruit Oct. A tree up to 70', endemic and local.

Acetephila excelsa, *Müll. Arg.* Larut, Kunstl., fide Ridl. A shrub up to 8', of India and Ceylon; in Peninsula 2d, 4e, 5h, 9m.

Andrachne australis, *Zoll.* 300-500', Kunstl., fide Ridl. A small shrub of Indo-Australia; in Peninsula 3e only.

Phyllanthus frondosus, *Wall.* 2500-4700', Wray 1856, Ridl., Anders. 66, B. & H. 12579; fr. March, June, Dec. A shrub up to 6', of Siam, Lingga and Carimon Islands; in Peninsula common.

Phyllanthus gomphocarpus, *Hook. fil.* Larut, Kunstl., fide Ridl. A shrub up to 8', of Siam; in Peninsula 1b, 3f, 4f, 5h, 6j, 6k, 7k.

Phyllanthus urinaria, *Linn.* 300-3800', Hend. 10311, B. & H. 13005; fr. March, Aug. A small herb, pantropic; in Peninsula common.

Phyllanthodendron dubium, *Gage.* 300-2000', Kunstl. 4941, Ridl. 2972, 14547; fr. Feb. fruit Aug., Sept. A shrub, endemic, 1b, 2c, 4e, 3f.

Glochidion coronatum, *Hook. fil.* 200-500', Wray 1956, Kunstl. 6678; fr. May, Oct. A shrub up to 12', of Tenasserim and Lower Siam; in Peninsula common on the West.

Glochidion desmocarpaceum, *Hook. fil.* At Changkat Serdang, Wray, fide Ridl. A tree up to 30', endemic, 4f, 5h, 6k, 9m.

Glochidion laevigatum, *Hook. fil.* 2500-4750', H. & N. 2376, B. & H. 12576, 12884; fr. Feb., March. A tree up to 50', of Tenasserim; in Peninsula 2d, 4h, 5h, 6k, 0k, 7l, 9m.

Glochidion leiostylum, Kurz. At 100', Kunstl. 5435; flr. Jan. A tree up to 25', of Burma to Lower Siam; in Peninsula 1h, 4h, 5h, 6k, 9m.

Glochidion microbotrys, Hook. fil. 500-800', Kunstl. 7479; fruit April. A tree up to 50', of Lower Siam; in Peninsula 5h, 9m.

Glochidion perakense, Hook. fil. At Taiping, Wray 1683, Ridl.; flr. Feb. A tree up to 20', endemic, 2h, 2d, 4f.

Glochidion sericeum, Hook. fil. At 300', Wray 2327; fruit June. A small tree of W. Malaysia; in Peninsula common from Taiping to Singapore.

Flueggia microcarpa, Bl. At Ulu Tupai, Wray 2686; flr. and fruit Aug. A bush or small tree of Trop. Africa and Indo-Australia; in Peninsula common in the North.

Breynia angustifolia, Hook. fil. 200-1000', Kunstl. 3949, Hend. 10230; fruit Nov. A shrub up to 10', endemic, 4f.

Breynia coronata, Hook. fil. 3000-3500', Kunstl. 2229; fruit Aug. A tree up to 20', endemic and common.

Drypetes pendula, Ridl. 600-1500', Kunstl. 3540, 6733; fruit Oct. A tree up to 60', endemic, 2d, 5h, 9m.

Drypetes perakensis, Gage. Larut, Kunstl., fide Ridl. A shrub or small tree, endemic and local.

Antidesma alatum, Hook. fil. 1500-3000', Wray 1675, 2794, Kunstl. 2211, 5010, Curt. 1322, Ridl. 2978, 5503; flr. Dec., fruit June, Aug., Oct. A tree up to 30', of Lower Siam; in Peninsula common from Taiping southwards.

Antidesma coriaceum, Tulasne. 100-1500', Wray 1854, Kunstl. 4212, 5372, 5422, 5598, 8394, 8470; flr. Jan., Dec., fruit Feb., May. A tree up to 30', of Lower Siam and Borneo; in Peninsula common.

Antidesma cuspidatum, Müll. Arg. At 300', Wray 1839; fruit April. A tree of Borneo; in Peninsula common.

Antidesma gracillimum, Gage. At about 2500', Wray, fide Ridl. A small tree, endemic, 4d.

Antidesma Kunstleri, Gage. At about 2500', Ridl. 2975. A shrub up to 9', endemic, 4d.

Antidesma leucocladon, Hook. fil. Larut, Kunstl., fide Ridl. A shrub or small tree, endemic, 2d, 4e, 5g.

Antidesma montanum, *Bl.* 200-800', Wray 2146, Kunsth. 2031; fruit June, July. A tree up to 40', of Indo-Malaya; in Peninsula common at low altitudes.

Antidesma pachystachys, *Hook. fil.* 500-800', Kunsth. 5778; fruit Nov. A shrub up to 15', endemic, 2d.

Antidesma pendulum, *Hook. fil.* 300-800', Wray 2559, 3284, Kunsth. 3460; flr. July. A shrub up to 8', endemic, 4d, 4f, 9l.

Antidesma stipulare, *Bl.* Larut, Kunsth., fide Ridl. A shrub or small tree of W. Malaysia except Sumatra; in Peninsula 5h, 8l.

Antidesma tomentosum, *Bl.* 1500-2500', Wray 2983, Kunsth. 3928; fruit Feb. A shrub or small tree of W. Malaysia; in Peninsula 4d, 6e, 4f, 7g, 9k, 7l, 9l.

Daphniphyllum lancifolium, *Hook. fil.* 4000-4600', Kunsth. 7007. A tree up to 60', endemic and local.

Daphniphyllum laurinum, *Baill.* At 4700', B. & H. 12632; fruit March. A large shrub of Siam and W. Malaysia; in Peninsula common.

Aporosa arborea, *Müll. Arg.* Larut, Kunsth., fide Ridl. A tree up to 40', of Sumatra and Java; in Peninsula 4d, 6f.

Aporosa Benthamiana, *Hook. fil.* Larut, Ridl. (not seen). A tree up to 80', endemic, 2d, 5h 6k, 9m.

Aporosa falcifera, *Hook. fil.* Larut, Kunsth., fide Ridl. A tree up to 60', of Borneo; in Peninsula 4f, 5h, 9m.

Aporosa frutescens, *Bl.* Larut, Barnard C.F.40; fruit Sept. A shrub or tree of Sumatra and Java, in Peninsula common.

Aporosa Miqueliana, *Müll. Arg.* 100-500', Kunsth. 3322, 3501, 6658; flr. Oct., fruit Sept., Oct. A shrub or tree up to 40', of Sumatra and Borneo; in Peninsula 4f, 5g, 5h, 9l.

Aporosa nigricans, *Hook. fil.* 300-800', Kunsth. 3347, 3539; flr. Sept., Oct., fruit Sept. A tree up to 20', of Borneo; in Peninsula common.

Aporosa pseudo-ficifolia, *Pax.* 100-3000', Wray 2053, 2627, 3206, Kunsth. 2802, 3231, 5108, Ridl. 2973; flr. Feb., fruit June. A shrub up to 10', endemic, 2d, 5g, 6k.

Aporosa stellifera, *Hook. fil.* At 300', Kunsth. 3323; flr. Sept. A tree up to 30', endemic, 2d, 4d, 4f, 5h, 8k.

Baccaurea bracteata, *Müll. Arg.* 100-300', Kunsth. 5177, 5293, 6648; fruit Sept., Nov., Dec. A tree up to 40', of Sumatra and Borneo; in Peninsula 4f, 6f, 6g, 8h, 6j, 9l, 9m.

Baccaurea brevipes, *Hook. fil.* At 100', Scort. 1442, Kunsth. 6232; flr. June, Oct. A tree up to 20', of Borneo; in Peninsula common.

Baccaurea Griffithii, *Hook. fil.* At 100', Kunsth. 6617, Anders. 110; fruit March, Sept. A tree up to 60', endemic and common.

Baccaurea Hookeri, *Gage*. Larut, Kunstl., fide Ridl. A tree up to 70', endemic, 9m.

Baccaurea Kingii, *Gage*. Larut, Kunstl., fide Ridl. A tree up to 50', endemic, 2d, 4f, 6k, 9m.

Baccaurea latifolia, *King*. 800-1000', Kunstl. 6702; fr. Oct. A tree up to 60', endemic, 9m.

Baccaurea macrophylla, *Müll. Arg.* At Kota, Wray 2406; fruit Aug. A tree up to 80', of Borneo; in Peninsula 2d, 4f, 5g, 9m.

Baccaurea Maingayi, *Hook. fil.* 1500-2000', Kunstl. 6837; fruit Nov. A tree up to 60', endemic, 6k, 9m.

Baccaurea malayana, *King*. Larut, Kunstl., fide Ridl. A tree up to 80', endemic, 6e, 4f, 5h, and cultivated.

Baccaurea minor, *Hook. fil.* Larut, Kunstl., fide Ridl. A tree up to 30', endemic, 1d, 4f, 9m.

Baccaurea Motleyana, *Müll. Arg.* At 200', Hend. 10227; fruit Nov. The Rambai. A tree of about 60', of Sumatra and Borneo; in Peninsula cultivated.

Baccaurea parviflora, *Müll. Arg.* 800-1500', Kunstl. 3963; fruit March. A tree up to 15', of Indo-Malaya; in Peninsula common.

Baccaurea polyneura, *Hook. fil.* At 100', Kunstl. 6511; fr. Aug. A tree up to 80', endemic, 6k.

Baccaurea sapida, *Müll. Arg.* 100-2500', Wray, Kunstl. 3278, 6700, Ridl.; fr. Aug., Oct. A tree up to 50', of Indo-Malaya; in Peninsula 1b, 0k.

Baccaurea Wallichii, *Hook. fil.* At 500', Kunstl. 3717; fruit Jan. A tree up to 40', of Borneo; in Peninsula, 2d, 6f, 5h, 6k, 9l, 9m.

Baccaurea Wrayi, *King*. 2500-3500', Wray 513, Kunstl. 6353; fruit July. A tree up to 80', endemic, 1a, 2d, 8h.

Scortechinia Kingii, *Hook. fil.* 800-1000', Kunstl. 3776; fruit Jan. A tree up to 60', of Borneo; in Peninsula 6k, 9k.

Elateriospermum Tapos, *Bl.* At Waterloo, Robertson-Glasgow; fruit Dec. A tree up to 100' or more, of W. Malaysia; in Peninsula 2d, 4f, 5h, 6j, 6k.

Galearia subulata, *Müll. Arg.* Larut, Kunstl., fide Ridl. A shrub up to 18', endemic, 2d, 4f.

Croton argyратum, *Bl.* 300-500', Kunstl. 7420; fr. March. A tree up to 40', of Indo-Malaya to the Philippines; in Peninsula common.

Croton confusum, *Gage*. Larut, Kunstl., fide Ridl. A shrub or tree up to 30', of Siam; in Peninsula 2d, 6j, 7k, 9l, 9m.

Croton Griffithii, *Hook. fil.* 1000-2000', Curt. 2057; fr. Sept. A shrub or tree, endemic and common.

Trigonostemon indicus, Müll. Arg. At about 1000', Wray 2633; fl. and fruit Aug. A tree up to 30', of Siam to Sumatra; in Peninsula common.

Trigonostemon longifolius, Baill. 500-800', Kunstl. 5224; fruit Nov. A shrub up to 12', of Tenasserim and Sumatra; in Peninsula common.

Agrostistachys borneensis, Becc. 500-2500', Wray 2976, Kunstl. 3523, Curt. 2688, Ridl. 5493; fl. May, June, fruit Oct. A spreading shrub of Borneo; in Peninsula 2c, 2d, 3f, 5h, 0m.

Agrostistachys Gaudichaudii, Müll. Arg. Taiping Hills. Kunstl., fide Ridl. A tree up to 60', endemic and common.

Agrostistachys sessilifolia, Pae. & Hoffm. 500-1000', Wray 2644, Kunstl. 3459; fl. Aug. A small shrub, endemic and common.

Ostodes macrophylla, Benth. 1000-1800', Kunstl. 3916, Curt. 2685; fl. May, fruit Feb. A tree up to 40', of Java to the Philippines; in Peninsula 5g, 6g, 5h, 6j, 6k, 9m.

Ostodes muricata, Hook. fil. Up to 500', Kunstl. 3415; fruit Sept. A shrub or small tree, endemic, 2d, 3f, 4f.

Claoxylon indicum, Hassk. 200-4000', Wray 2175, Ridl. 2980; fl. Feb., fruit Feb., June. A shrub of Indo-Malaya; in Peninsula common.

Claoxylon Kingii, Hook. fil. 2000-2500', Kunstl., fide Ridl. A shrub up to 6', endemic and local.

Claoxylon Wallichianum, Müll. Arg. At 2000', Curt. 2056; fl. Sept. A tree up to 20', endemic, 2d.

Coelodepas longifolium, Hook. fil. 500-1000', Kunstl., fide Ridl. A tree up to 30', endemic and local.

Alchornea villosa, Müll. Arg. At about 1000', Ridl. 2796. A bush of Sumatra and Java; in Peninsula common.

Epiprinus malayanus, (Triff. 300-2200', Wray 2213, Kunstl. 3228, 3543, 3908, 6875, Curt. 1338; fl. Feb., June, Aug., Dec., fruit Nov. A shrub up to 9', of Sumatra; in Peninsula 2c, 2d, 4e, 5g, 5h, 6j, 6k.

Melanolepis multiglandulosa, Rehb. fil. & Zoll. At Kota, Wray, fide Ridl. A tree up to 30', of Indo-Malaysia and S. China; in Peninsula 6d, 6g, 5h.

Mallotus barbatus, Müll. Arg. At 100', Scott. 277, Kunstl. 1823, Ridl.; fl. April, fruit April, June. A large bush of Indo-Malaya and S. China; in Peninsula 2b, 2d, 4d, 4e, 4f.

Mallotus cochinchinensis, Lour. At 3100', B. & H. 12571; fl. and fruit March. A tree up to 30', of Indo-Malaya and China; in Peninsula common.

Mallotus floribundus, Müll. Arg. At Changkat Serdang, Wray, fide Ridl. A tree up to 40', of Malaysia; in Peninsula 1a, 2c, 4d, 4f, 6f, 7h, 8h, 6k, 9l.

Mallotus macrostachys, *Müll. Arg.* 400-1000', Kunstl. 2303, 2496, Curt. 2055, Fox 108; flr. Sept., Oct. A large shrub or small tree of Siam to Borneo; in Peninsula common.

Mallotus repandus, *Müll. Arg.* 100-2000', Wray 3330, Ridl.; fruit Feb. A climber up to 80', of Indo-Australia; in Peninsula 2b, 2d, 3f, 5h, 6j.

Mallotus Wrayi, *King.* 300-1000', Kunstl. 3165, 3456; flr. Aug., fruit Oct. A tree up to 80', endemic, 3f.

Ptychopyxis costata, *Wig.* Taiping Hills, Ridl. 5499; fruit June. A tree up to 40', of Sumatra; in Peninsula 5h, 6k, 9m.

Ptychopyxis Kingii, *Ridl.* 500-3000', Kunstl., fide Ridl. A tree up to 50', endemic and local.

Macaranga denticulata, *Müll. Arg.* At Taiping, Hend. 10147, 10217, 10372, 10443; flr. Jan., Feb., fruit Nov. A tree up to 40', of Indo-Malaya; in Peninsula 2b, 6e, 4f, 5g, 5h, 7h.

Macaranga Hosei, *King.* At Taiping, Wray, fide Ridl. A tree up to 40', of Borneo; in Peninsula 8d, 4f, 6k.

Macaranga Hullettii, *King.* At about 2500', Ridl., 5497; fruit June. A tree up to 30', endemic, 3f, 4f, 5g, 4h, 5h, 5j, 6k.

Macaranga Lowii, *King.* Larut, Kunstl., fide Ridl. A tree up to 15', endemic, 2d, 6c, 5h, 6k, 9m.

Macaranga Maingayi, *Hook. fil.* Larut, Kunstl., fide Ridl. A tree up to 40', endemic, 6k.

Macaranga puncticulata, *Huge.* At Taiping, Hend. 10044; fruit Jan. A bush or tree of Borneo; in Peninsula 5g, 4h, 9m.

Macaranga Tanarius, *Müll. Arg.* At Kota, Wray, fide Ridl. A small tree of Indo-Australia; in Peninsula common.

Endospermum malaccense, *Müll. Arg.* 100-300', Wray 2320, 2379, Kunstl. 6392; flr. June, July. A tree up to 80', endemic and common.

Endospermum perakense, *King.* Larut, Kunstl., fide Ridl. A tree up to 80', endemic and local.

Pimeleodendron Griffithianum, *Benth.* At 2000', B. & H. 12827; fruit Feb. A tree up to 40', endemic, 2d, 4e, 5g, 4h, 5h, 6k, 9m.

Homalanthus populifolius, *Grah.* At Waterloo, 1500', Curt. 2684; flr. May. A tree up to 20', of Malaysia to Australia; in Peninsula 2d, 1d, 4f, 6g, 5h, 0j.

Excoecaria sp. 2000-3000', Kunstl. 2344, fide Hooker. An imperfectly known species.

Sapium indicum, *Willd.* At about 3000', Ridl.; fruit June. A tree of Indo-Malaya; in Peninsula common on the sea-coasts.

URTICACEAE.

Trema amboinensis, *Bl.* At Taiping, Hendl. 10038; flr. Jan. A shrub or small tree of Indo-Australia and China; in Peninsula common.

Gironniera nervosa, *Planch.* Larut, Kunsth., fide Ridl. A tree up to 80', of Sumatra and Borneo; in Peninsula, Penang to Singapore.

Gironniera parviflora, *Planch.* Taiping Hills, Ridl. (not seen). A tree up to 60', of the Carimon Is.; in Peninsula common.

Gironniera subaequalis, *Planch.* At 2500', Ridl. (not seen). A tree up to 80', of Indo-Malaysia; in Peninsula 2d, 4f, 5g, 5h, 6k, 9m.

Sloetia sideroxylon, *Tys. & Binn.* 500-800', Wray 2226, 2561, Haniff 1320; fruit March. A tree up to 100', of W. Malaysia; in Peninsula common.

Ficus acamptophylla, *Miq.* At 3000'. Scott. 310. A climbing epiphyte or tree of Bangka and Borneo; in Peninsula 4d, 3f, 4f, 9l.

Ficus alba, *Reinw.* 200-1500', Kunsth. 1855, Hendl. 10063. A shrub up to 8', of W. Malaysia; in Peninsula common.

Ficus annulata, *Bl.* Larut, Kunsth., fide Ridl. An epiphyte or tree up to 50', of Indo-Malaya; in Peninsula common.

Ficus apiocarpa, *Miq.* 100-300'. Wray 1957, Kunsth. 5149. A woody climber of W. Malaysia to the Philippines; in Peninsula common.

Ficus araneosa, *King.* 300-500', Kunsth. 3565(?). A slender epiphytic climber, endemic, 4f.

Ficus bracteata, *Wall.* At 600', Barnard 6001. A large shrub or small tree of Java and Borneo; in Peninsula 5h, 6k, 9m.

Ficus callicarpa, *Miq.* Larut, Kunsth., fide Ridl. A woody climber of Tenasserim and W. Malaysia; in Peninsula common.

Ficus celebica, *Bl.*, var. *Kunstleri*, *Ridl.* Larut, Kunsth., fide Ridl. A climber, the species in Celebes, the Philippines, and N. Guinea; in Peninsula the var. endemic and local.

Ficus chartacea, *Wall.* 3800-4400', Kunsth. 3217 (var. *torulosa*). Fox 176, B. & H. 12572. A shrub up to 6', of Burma; in Peninsula common.

Ficus chrysocarpa, *Reinw.* At about 2500', Wray 2799. A shrub about 4', of Indo-Malaya; in Peninsula 3f, 4f, 5g, 6k, 9m.

Ficus consociata, *Bl.* Larut, Kunsth., fide Ridl. An epiphyte of W. Malaysia; in Peninsula, Penang to Singapore.

Ficus copiosa, *Steud.* At about 3000', Wray 1723, Curt. A shrub or small tree of W. Malaysia except Borneo; in Peninsula 3e only.

Ficus cunia, *Ham.* Taiping Hills, Ridl., (not seen). A bush or small tree of India to Tenasserim; in Peninsula 6d, 6e, 5g, 7g, 5h, 7l.

Ficus cuspidata, *Reinw.*, var. *sinuata*, *King.* 2500-3000', Ridl. (not seen). An erect shrub or tree, the species of Malaysia; the var., endemic and local.

Ficus diversifolia, *Bl.* 100-4600', Wray 649 (var. *lutescens*), Scort. 308 (var. *Kunstleri*), H. & N. 2368, Hend. 10239 (var. *ovoidea*). A bush, epiphytic or not, of Malaysia; in Peninsula common and variable.

Ficus fistulosa, *Reinw.* 2000-3000', Wray 2937. Scort 274. Kunstl. 6339, H. & N. 2355. A bushy tree of Indo-Malaya and China; in Peninsula 2c, 2d, 4f, 6f, 5g.

Ficus fulva, *Reinw.* 100-500', Hend. 10040, 10166. A small tree of Indo-Malaya; in Peninsula 5g, 5h.

Ficus glabella, *Bl.* Larut, Kunstl., fide Ridl. A tree up to 60' of Indo-Malaya; in Peninsula common.

Ficus glandulifera, *Wall.* 100-3000', Wray 2331, Kunstl. 6326, 8509. A shrub or tree up to 60', of W. Malaysia; in Peninsula 2d, 9l, 9m.

Ficus globosa, *Bl.* 100-4500', Ridl. 2970, 14550. A bushy climber of Indo-Malaya; in Peninsula common.

Ficus heterophylla, *Linn.* At Kota, Wray 3335. A creeping shrub, eventually a small tree, of Indo-Malaya; in Peninsula 4f, 6g, 8g, 5h.

Ficus hispida, *Linn.* At 300', Ridl. (not seen). A shrub or small tree of Indo-Australia and China; in Peninsula common.

Ficus indica, *Linn.* 100-800', Kunstl. 8495 (var. *Gelderi*), Hend. 10245. A tree of Indo-Malaya to the Philippines; in Peninsula common.

Ficus laevis, *Bl.* Larut, Kunstl., fide Ridl. An epiphyte or small tree of Indo-Malaya; in Peninsula Penang to Singapore.

Ficus lepicarpa, *Bl.* At 300', Wray 1983. A small tree of W. Malaysia; in Peninsula 2d, 4f, 5g, 5h, 5j, 6j.

Ficus Lowii, *King.* 1500-2000', Kunstl. 5412. A liane, endemic, 4d, 4f.

Ficus microstoma, *Wall.* Larut, Kunstl., fide Ridl. A tree up to 60', of Java; in Peninsula 5h, 6k, 9l, 9m.

Ficus obpyramidata, *Hook. fil.* Larut, Kunstl., fide Ridl. A tree up to 30', endemic, 5h.

Ficus obscura, *Bl.* At 3500', H. & N. 2333. A shrub or tree of Indo-Malaya; in Peninsula 4d, 5h, 0k, 9m.

Ficus obtusa, *Hussk.* Larut, Kunstl., fide Ridl. A large epiphytic shrub of W. Malaysia to the Philippines; in Peninsula 2d, 4f, 5h, 6k.

Ficus parietalis, *Bl.* At Kota, Wray 3318. An epiphytic shrub of W. Malaysia; in Peninsula 1a, 2d, 3g, 8g, 6k.

Ficus pisifera, *Wall.* At Taiping, Wray 2401. A climbing epiphyte, becoming a tree, of W. Malaysia to the Philippines; in Peninsula common.

Ficus pisocarpa, *Bl.* Larut, Kunstl., side Ridl. A small tree of Java; in Peninsula 9m.

Ficus polysyce, *Ridl.* At 300', Wray 2668. A tree about 50', of Lower Siam; in Peninsula common.

Ficus pomifera, *Wall.* Larut, Kunstl., side Ridl. A tree of Indo-Malaya; in Peninsula 4d, 4f, 6f, Johore.

Ficus procera, *Reinw.* At 300', and Waterloo, Wray 2536, Robertson-Glasgow. A tree of Sumatra and Java; in Peninsula 4d, 26g, 6k, 9m.

Ficus pruniformis, *Bl.* At 200', Wray 2137. An epiphyte of W. Malaysia to the Philippines; in Peninsula 4e, 3f, 4f.

Ficus punctata, *Thunb.* 3200-3700', B. & H. 12720, 12795. A woody climber of W. Malaysia; in Peninsula common.

Ficus pyriformis, *Hook. & Arn.* Taiping Hills, Ridl. A shrub up to 15', of India to Tenasserim and S. China; in Peninsula 5e, 4d, 6d, 4e, 6e, 4f.

Ficus ramentacea, *Rorb.* 100-1000', Wray 2333, 4040. A liane of Indo-Malaya; in Peninsula common.

Ficus recurva, *Bl.* 300-600', Wray 2369, Kunstl. 5490. An epiphytic climber of W. Malaysia to the Philippines; in Peninsula common.

Ficus religiosa, *Linn.* Planted as a roadside tree. A native of India.

Ficus rostrata, *Lamk.* 300-4000', all collectors. A climbing or erect shrub of Indo-Malaya; in Peninsula common.

Ficus subulata, *Bl.* At Tupai, Wray 2436. A liane of Indo-Malaya and S. China; in Peninsula 6b, 2d, 4e, 3f 4f, 5h, 6k, 7k.

Ficus urophylla, *Wall.* 2000-3500', Curt. 2060, Ridl., H. & N. 2369. An epiphytic shrub of Indo-Malaya; in Peninsula common.

Ficus variolosa, *Lindl.* At 4700', B. & H. 12661. A shrub or small tree of Hongkong; in Peninsula 4f.

Ficus villosa, *Bl.* 600-1000', Kunstl. 4215. A liane of W. Malaysia to the Philippines; in Peninsula 2d, 4f, 5g, 5h, 6k, 9m.

Ficus xylophylla, *Wall.* At 3200', B & H. 12781. An epiphyte or tree of Sumatra and Borneo; in Peninsula 2d, 4f, 5h, 6k, 9m.

Ficus sp. 3000-4000', H. & N. 2494, B. & H. 12954. A bush up to 8'. Near *F. urophylla*, but distinguished by the more numerous and horizontal nerves, and the very long tip to the leaf.

Artocarpus Gomeziana, Wall. At 300', Wray 2073. A tree up to 60', of Tenasserim and Borneo; in Peninsula, Penang to Singapore.

Artocarpus Kunstleri, Hook. *fl.* Larut, Kunstl., fide Ridl. A tree up to 100', endemic, 6f, 6j, 6k, 7l, 9m.

Artocarpus Lowii, Hook. *fl.* Larut, Kunstl., fide Ridl. A tree up to 70', endemic, 5g.

Artocarpus Maingayi, King. 300-500', Kunstl. 6963. A tree up to 40', endemic, 6g, 5h, 6k, 9m.

Artocarpus rigida, Bl. Larut, Kunstl., fide Ridl. A tree up to 100', of Burma, Sumatra and Java; in Peninsula 4f, 5g, 5h, 6k, 9m.

Conocephalus amoenus, Hook. *fl.* Taiping Hills, Ridl. (not seen). A stout climbing epiphyte of Borneo; in Peninsula common.

Conocephalus ?suaveolens, Bl. At 3800', B. & H. A climber of Indo-Malaya and the Philippines; in Peninsula common.

Conocephalus subtrinervis, Miq. Taiping, Wray, fide Ridl. At 2000', Curt. A slender erect epiphyte of Borneo and ?Sumatra; in Peninsula common.

Prainea scandens, King. Larut, Kunstl., fide Ridl. A liane, endemic and local.

Pilea muscosa, Lindl. 300-3700', Ridl. 14546, B. & H. 12916; fr. Feb. A small fleshy herb of S. America, occurring in the Peninsula in shady spots in Penang, Kuala Lumpur, Malacca, Singapore, etc.

Pellionia Duvauana, N. E. Br., var. *viridis*, Ridl. Larut Hills, Kunstl., fide Ridl. A creeping herb of Tenasserim; in Peninsula common.

Pellionia javanica, Wedd. Maxwell's Hill, Ridl. (not seen). A creeping herb of Java; in Peninsula 1a, 2d, 4d, 4f.

Elatostemma acuminatum, Brugn. Taiping Hills, Curt., fide Ridl. A slender herb of Indo-Malaya; in Peninsula 4t, 5g, 5h, 6k.

Elatostemma molle, Wedd. At 4000', B. & H. 12858. A herb of Himalaya and Assam; in Peninsula 2d, 4d, 6e.

Elatostemma sessile, Forst. At 4200', B. & H. 13022. A herb of Indo-Australia and Africa; in Peninsula 2d, 4d, 4f, 5g, 6g, 5h.

Procris latifolia, Bl. Taiping Hills, Ridl. (not seen). A small shrub of Tenasserim to the Pacific; in Peninsula 4d, 4f, 5g, 6g, 5h.

Debregeasia squamata, Hook. *fl.* Taiping Hills, Ridl. (not seen). A shrub up to 15', endemic, 4e, 4f, 5h.

JUGLANDACEAE.

Engelhardtia Wallichiana, Lindl. At about 2500', Ridl. 5478; fruit June. A tree up to 100', endemic, 2d, 5g.

CUPULIFERAE.

Quercus odocarpa, *Korth.* 500-800', *Kunstl.* 3723; fruit Jan. A tree up to 100' of Burma, Sumatra and Borneo; in Peninsula 2d, 6k.

Pasania Blumeana, *Gamble.* 3500-4000', *Kunstl.* 3232, Derry; fruit Aug. A tree up to 50', of W. Malaysia; in Peninsula 3e only.

Pasania Cantleyana, *Gamble.* 300-1000', *Kunstl.* 5112, 5396, 5475, 5554; flr. Nov., fruit Jan., Feb. A tree up to 80', endemic and common.

Pasania corocarpa, *Schky.* 300-700', B. & H. 13178, 13224; flr. March. A tree about 80', of W. Malaysia; in Peninsula 4f, 5g, 4h, 9m.

Pasania costata, *Gamble.* 500-1000', *Kunstl.* 7277; fruit Feb. A tree up to 80', of Sumatra and Java; in Peninsula 4f, 6j, 9k.

Pasania Curtisii, *Gamble.* Up to 1000', *Kunstl.*, fide *Gamble.* A tree about 40', endemic, 2d, 5g, 5h.

Pasania cyclophora, *Gamble.* 2000-3000', *Kunstl.* 6888; flr. Nov. A tree up to 100', of Borneo; in Peninsula 2d, 4f, 5g.

Pasania cyrtorhyncha, *Gamble.* 500-800', *Kunstl.* 4898; flr. Sept. A tree up to 50', of Sumatra, Borneo and the Philippines; in Peninsula Taiping to Singapore.

Pasania discocarpa, *Gamble.* 800-1500', *Kunstl.* 5482; flr. Jan. A tree up to 130', of Sumatra and Borneo; in Peninsula 2d, 5h, 6j.

Pasania Eichleri, *Gamble.* 300-1500', *Kunstl.* 3875, 4043, 4092, 5570; flr. Sept., fruit Feb., March. A tree up to 100', of Sumatra; in Peninsula 6g, 5h.

Pasania encleisocarpa, *Gamble.* 300-1000', *Kunstl.* 5143, 5594, 5689; fruit Nov. A tree up to 60', of Sumatra; in Peninsula 2d, 3f, 5g, 5h, 6k, 9m.

Pasania Ewyckii, *Gamble*, var. *latifolia*, *King.* Up to 800', *Kunstl.* 8532, fide *Gamble.* A tree up to 40', the species of Sumatra and Borneo; in Peninsula the species at 2d, 4f, 7g, 9m, the var. at 9m.

Pasania grandifrons, *Gamble.* 300-4000', *Kunstl.* 3766, 4870, 5365, 6544, 7259; flr. Sept., fruit Feb. A tree up to 100', endemic, 2d, 4e.

Pasania Kunstleri, *Gamble.* 100-1000', *Kunstl.* 2482, 5128, 5436; flr. Oct., Nov., fruit Jan. A tree up to 30', of Borneo; in Peninsula 1b, 3f, 4f, 5h.

Pasania lappacea, *Oerst.* 300-500', *Kunstl.* 3919; flr. Oct. A tree up to 80', of India and Burma; in Peninsula 3e only.

Pasania lamponga, *Gamble.* 100-500', *Kunstl.* 6490, 6578, 6910, 7278; flr. Sept., fruit Feb., Dec. A tree up to 80', of Sumatra and Borneo to Papua; in Peninsula common.

Pasania lucida, *Gamble*. 300-4700', Wray 2217, Kunstl. 3997, 5086, 5279, 5351, 6500, 6914, B. & H. 12587; fruit March, Aug., Dec. A tree of about 80', endemic and common.

Pasania omalokos, *Schky*. 2500-3000', Kunstl. 6901; fruit Nov. A tree up to 100', of Sumatra; in Peninsula 4f, 6j, 6k, 9m.

Pasania Rassa, *Gamble*. 4500-4600', Kunstl. 6957; fruit Dec. A bush or tree up to 60', of W. Malaysia; in Peninsula 2d, 6c, 5g, 6g, 7k, 9m.

Pasania Scortechinii, *Schzy*. At about 3500', Kunstl. 2188, fide Gamble. A tree up to 100', endemic and local.

Pasania spicata, *Oerzl*, var. *gracilipes*, *DC.* Larut, Kunstl., fide Ridl. A tree up to 80', of Indo-Malaya; in Peninsula common and variable.

Pasania sundaica, *Oerzl*. 100-2500', Wray 2563, 2699, 3103, Kunstl. 2232, 3866, 3944, 4870, 6583, 7013, 7371, Fox 185; flr. July-Sept., fruit Aug., Oct., Dec. A tree up to 80', of W. Malaysia to the Philippines; in Peninsula common.

Pasania Wallichiana, *Gamble*. 1000-4000', Kunstl. 5795, Curt., Ridl.; fruit Sept. A tree up to 60', endemic and common.

Pasania Wrayi, *Gamble*. At Kota, Wray 2854. A tree, endemic, 4f.

Castanopsis costata, *A. DC.* Up to 4600', Wray, Kunstl. 2909, 3651, 6975, fide Gamble. A tree up to 50', of W. Malaysia; in Peninsula 3e only.

Castanopsis megacarpa, *Gamble*. 300-800', Kunstl. 6469, 6522, Haniff 13134; flr. Aug., fruit March. A tree up to 80', endemic and common.

Castanopsis nephelioides, *King*. 100-800', Kunstl. 5542, 6518; flr. Feb. A tree up to 60', endemic, 4f, 6k, 9m.

Castanopsis Ridleyi, *Gamble*. At 100', Kunstl. 6831; fruit Nov. A tree up to 80', endemic, 6k.

Castanopsis sumatrana, *A. DC.* 100-1000', Wray 2168, Kunstl. 3788, 5382, 5510; flr. Feb., Dec., fruit Jan. June. A tree up to 80', of Indo-Malaya to the Philippines; in Peninsula Penang to Malacca.

Castanopsis Wallichii, *King*. At 4000', Fox 108; fruit Oct. A tree of about 80', endemic and common.

SALICINACEAE.

Salix tetrasperma, *Roxb.* In open low ground near water, Kunstl. 1987, fide Gamble. A small tree up to 30', of S. E. Asia; in Peninsula 2d, 4d, 6d, 4e, 5g, 5h, 8h, 6k, perhaps in most places planted.

HYDROCHARIDACEAE.

Ottelia alismoides, *Pers.* At 100', Kunstl. 4073, 5530; flr. and fruit Feb., March. A submerged freshwater herb of Indo-Australia and Africa; in Peninsula 1b, 6b, 2d, 4f, 5h, 6k.

ORCHIDACEAE.

Microstylis acutangula, *Hook. fil.* 3000-4000', Ridl.; flr. March. A terrestrial herb, endemic, 4f, 5h, 6j, 9l.

Microstylis congesta, *Rehb. fil. Malaxis latifolia*, *Sm.* At about 3000', Ridl. A terrestrial herb of Indo-Australia and China; in Peninsula common.

Microstylis micrantha, *Hook. fil. Malaxis micrantha*, *Ktze.* 3000-4000', Ridl., Hervey; flr. June. A creeping herb of Borneo; in Peninsula 6k, 7l, 8l, 9m.

Microstylis perakensis, *Ridl.* 200-3000', Curt., Ridl.; flr. Sept., fruit June. A small terrestrial herb of ?Java; in Peninsula 6d, 4e, 4f.

Oberonia brunnescens, *Ridl.* Larut Hills, Ridl. An epiphyte, endemic, and local. The only sheet of this in Herb. Singap. is labelled "Perak, loc. incert."

Oberonia insectifera, *Hook. fil.* At 3500', Kunstl. 2793, fide Ridl. A small epiphyte, endemic, 6e.

Oberonia Prainiana, *King.* Taiping Hills, Ridl.; flr. Dec. A small epiphyte of Himalaya and Siam; in Peninsula 2d, 6j.

Oberonia rosea, *Hook. fil.* Larut Hills, Kunstl. 2664, fide Ridl. An epiphyte, endemic, 2d, 4f.

Liparis atosanguinea, *Ridl.* At 3500', Curt., flr. Dec. A terrestrial herb, endemic and local.

Liparis comosa, *Ridl.* At 2000', Curt., Anders. 94; flr. Sept., fruit March, Sept. A small epiphyte, endemic, 4d, 4f, 5h.

Liparis compressa, *Lindl.* At 4000', Curt. 2069, Ridl.; flr. March, Sept. An epiphyte of W. Malaysia and the Philippines; in Peninsula 4f, 5g.

Liparis disticha, *Lindl.* Larut, Kunstl. 4986, fide Ridl. An epiphyte of Indo-Malaysia and the Mascarene Is.; in Peninsula common.

Liparis elegans, *Lindl.* 300-3800', Kunstl. 7283, Ridl, B. & H.; flr. and fruit Feb. An epiphyte or rock plant of Borneo; in Peninsula common.

Liparis ferruginea, *Lindl.* At 100', Kunstl. 7282; flr. Feb. A terrestrial herb of Indo-China and Borneo; in Peninsula 4f, 6k, 9m.

Liparis furcata, *Ridl.* At 4000', Ridl.; fruit March, Dec. A small terrestrial herb, endemic and local.

Liparis lacerata, *Ridl.* At 3000', *Ridl.*; flr. and fruit June. An epiphyte of Tenasserim and Borneo; in Peninsula 1b, 3f.

Liparis latifolia, *Lindl.* 3060-4500', *Ridl.* An epiphyte of Java and Borneo; in Peninsula 5h.

Liparis longipes, *Lindl.* Taiping Hills, Derry; flr. Sept. An epiphyte of Indo-Malaya and China; in Peninsula 2d, 4f.

Liparis Maingayi, *Ridl.* 3000-2300', *Ridl.*, Derry, Anders. 42, B. & H. 12704; flr. March, June, Oct., Dec. A herb on wet rocks, endemic, 2c, 2d, 1f, 5g, 7k.

Liparis parvula, *Ridl.* 3000-3900', Fox, *Ridl.*, B. & H. 12721; flr. March. A small terrestrial herb, endemic and local.

Liparis transtillata, *Ridl.* At Maxwell's Hill, *Ridl.* A terrestrial herb, endemic and local.

Platyclinis gracilis, *Hook. fil.* 3000-4500', *Curt.*, *Ridl.*, Derry; flr. Sept., fruit March. An epiphyte of Java; in Peninsula 6c, 4f, 5h.

Platyclinis Kingii, *Hook. fil.* *Dendrochilum Kingii*, *Pftz.* Larut Hills, *Curt.* 2756; flr. March. An epiphyte of Borneo; in Peninsula 4e, 6c.

Platyclinis sarawakensis, *Ridl.* Taiping Hills, *Curt.*, fide *Ridl.* An epiphyte of Borneo; in Peninsula 3e only.

Dendrobium aegle, *Ridl.* 3000-4000', *Ridl.*, Derry, H. & N. 2304, B. & H. 12963; flr. Feb., March, June, Sept. An epiphyte, endemic, 7l.

Dendrobium atro-rubens, *Ridl.* At 4100', H. & N. 2346; flr. Feb. An epiphyte of Sumatra; in Peninsula 2c, 6c, 5g, 6g.

Dendrobium aureum, *Lindl.* var. *Philippinensis*. Larut Hills, Stephens, fide *Ridl.* An epiphyte of Indo-Malay to the Philippines; in Peninsula 3e only.

Dendrobium clavator, *Ridl.* At Taiping, *Ridl.* An epiphyte, endemic, 9l.

Dendrobium crocatum, *Hook. fil.* Larut, *Kunsth.*, fide *Ridl.* An epiphyte, endemic, 6c, 5h, 5j, 9m.

Dendrobium crumenatum, *Sw.* The Pigeon Orchid. An epiphyte of Indo-Malaya and China; in Peninsula very common on roadside trees etc.

Dendrobium Derryi, *Ridl.* Taiping Hills, Derry; flr. Jan. An epiphyte, endemic and local.

Dendrobium flabellum, *Rehb. fil.* 300-1800', Wray 3154, *Kunsth.* 6897; flr. Nov. A large epiphyte of Indo-Malaya; in Peninsula 4b, 6j, 7l, 9m.

Dendrobium Foxii, *Ridl.* At about 4000', Derry, B. & H. 12726; flr. March, Oct. An epiphyte, endemic and local.

Dendrobium gemellum, *Lindl.* At Taiping (Resident's Garden), Ridl. An epiphyte of Siam to Borneo; in Peninsula 1b, 4b, 6e, 6k, 9m.

Dendrobium geminatum, *Hook. fil.* 3000-4500', Curt. 2067. Fox, Derry, Stephens; flr. Sept., Dec. An epiphyte of Java; in Peninsula 2c, 6e, 4f, 5g.

Dendrobium Kelsalli, *Ridl.* At about 3000', Ridl. An epiphyte, endemic, 2c, 6e, 6g, 7k, 0k.

Dendrobium leonis, *Rchb. fil.* Anders. 132; flr. March. An epiphyte of Indo-China and Borneo; in Peninsula 2d, 6f, 7g, 8g, 5h, 5j, 6k, 7l, 9m.

Dendrobium longipes, *Hook. fil.* At about 4500', Ridl., Derry; fruit June. An epiphyte, endemic, 4e, 6e, 4f, 5g, 5h.

Dendrobium macropodum, *Hook. fil.* At 5000', Ridl. (not seen). An epiphyte of Sumatra and ?Java; in Peninsula 6e, 6g.

Dendrobium pachyglossum, *Par. & Rchb. fil.* 2500-3000', Ridl., Derry; flr. Oct. An epiphyte of Tenasserim; in Peninsula 1b, 2c, 6e.

Dendrobium pumilum, *Rorb.* At Taiping (Curt.: flr. Oct. An epiphyte of Burma and Borneo; in Peninsula common.

Dendrobium roseatum, *Ridl.* At 4000', (Curt. 2061; flr. Sept. An epiphyte, endemic, 5h.

Dendrobium rosellum, *Ridl.* At Taiping, Ridl. An epiphyte of Borneo; in Peninsula 9l.

Dendrobium sinuatum, *Lindl.* 100-4000', Curt., Ridl. An epiphyte of Borneo; in Peninsula 2d, 6e, 6g, 6k, 7l, 9l, 9m.

Dendrobium superbum, *Rchb. fil.* Larut Hills, Scort., Stephens, fide Ridl. An epiphyte of Borneo and the Philippines; in Peninsula 1b.

Dendrobium teres, *Lindl.* At about 3000', (Curt.; flr. June. An epiphyte of Borneo; in Peninsula 2d, 6j, 0k, 9l, 9m.

Dendrobium tetradon, *Rchb. fil.* At Taiping, Hobson, fide Ridl. An epiphyte of Java; in Peninsula 4d, 4e.

Dendrobium tubiferum, *Hook. fil.* G. Hijau, Murton fide Ridl. An epiphyte of Java and Borneo; in Peninsula 4d, 8g, 6j, 7l, 9m.

Dendrobium uniflorum, *Griff.* 3000-4000' (fide Ridl.), Curt., Ridl.; flr. Feb. An epiphyte of Borneo and the Philippines; in Peninsula 6e, 7k.

Dendrobium virescens, *Ridl.* At Taiping, Curt., fide Ridl. An epiphyte, endemic, 5c.

Bulbophyllum apodum, *Hook. fil.* Top of Batu Kurau, Scort., fide Ridl. An epiphyte of Borneo; in Peninsula 5j, 6j, 6k, 8l, 9m.

Bulbophyllum capitatum, *Lindl.* At about 4500', Curt.; flr. Sept. A tufted epiphyte of Java and Borneo; in Peninsula 2d, 6e, 4f, 5g, 6g, 5h, 7l.

Bulbophyllum catenarium, *Ridl.* At about 3000', Curt., *Ridl.*; flr. June, Oct. An epiphyte of Porneo; in Peninsula 6g, 5h, 9m.

Bulbophyllum citrinum, *Ridl.* At Taiping, *Ridl.* An epiphyte of W. Malaysia; in Peninsula 5k, 7k, Johore, 9m.

Bulbophyllum cleistogamum, *Ridl.* At Waterloo, 2000', Curt.: flr. Oct. An epiphyte of Rhio and Borneo; in Peninsula 3e only.

Bulbophyllum galbinum, *Ridl.* 3000-4000', Curt., *Ridl.* 2888, B. & H. 13199; flr. Feb.-April, June, Dec. A creeping epiphyte, endemic, 6e, 5g, 5h.

Bulbophyllum gigas, *Ridl.* At about 3000', *Ridl.* 5193; flr. June. An epiphyte, endemic, 4f.

Bulbophyllum leptosepalum, *Hook. fil.* At about 3000', *Ridl.*; flr. June. An epiphyte, endemic, 2d.

Bulbophyllum linearifolium, *King.* At 3800', B. & H. 12563; flr. March. An epiphyte, endemic, 2c, 4f.

Bulbophyllum Lobbii, *Lindl.* At Maxwell's Hill, Stephens; flr. Sept. An epiphyte of Tenasserim to Borneo; in Peninsula 3e, 4e, 8l.

Bulbophyllum Makoyanum, *Ridl.*, var. *Brienanum*, *Ridl.* At Taiping, Curt., *Ridl.* An epiphyte of Borneo and the Philippines; in Peninsula the species at 9m, the var. at 4f, 9l.

Bulbophyllum Medusae, *Rchb. fil.* Waterfall Hill, Wray, fide *Ridl.* An epiphyte of Siam and Borneo; in Peninsula common.

Bulbophyllum modestum, *Hook. fil.* At 3000', Curt., *Ridl.*; flr. June, Dec. A small epiphyte, endemic, 2c, 4f, 9m.

Bulbophyllum oblanceolatum, *King.* At 4000', *Ridl.*; flr. March. An epiphyte, endemic, 4f, 5g, 6g.

Bulbophyllum ochranthum, *Ridl.* 3000-4000', Curt., fide *Ridl.* An epiphyte, endemic and local.

Bulbophyllum perakense, *Ridl.* At Waterloo, Elphinstone, fide *Ridl.* An epiphyte, endemic and local.

Bulbophyllum pileatum, *Lindl.* Waterfall Hill, Wray, fide *Ridl.* An epiphyte of Sumatra; in Peninsula 2d, 9l, 9m.

Bulbophyllum psittacoides, *Ridl.* At 300', Curt.; flr. Dec. An epiphyte of Siam; in Peninsula 1b, 2d, 3f, 8g, 5j, 6j, 6k, 7l, 9m.

Bulbophyllum pulchellum, *Ridl.* At Taiping *Ridl.* An epiphyte of Lower Siam and Rhio; in Peninsula 1b, 2d, 6d, 5h, 9l, 9m.

Bulbophyllum selangorense, *Ridl.* Taiping Hills, Long, fide *Ridl.* An epiphyte, endemic, 2c, 5h.

Bulbophyllum vaginatum, *Rchb. fil.* At Taiping, Hend. 10205; flr. Aug. An epiphyte of Java and Borneo; in Peninsula common.

• **Bulbophyllum variabile**, *Ridl.* Taiping Hills, *Ridl.*; flr. April. An epiphyte, endemic, 4f.

Bulbophyllum Wrayi, *Hook. fil.* At 2500', Derry; flr. Sept. An epiphyte, endemic, 4l, 26d.

Dendrochilum album, *Ridl.* 3000-4600', Kunstl. 3279, Ridl.; flr. June, Aug. A creeping epiphyte of Tenasserim and Lower Siam; in Peninsula 4e, 5g.

Eria aeridostachya, *Rehb. fil.* 3000-4000', Ridl. (not seen.) An epiphyte of Malaysia; in Peninsula 3d, 6k, 9l, 9m.

Eria aporina, *Hook. fil.* At 2000', Ridl.; flr. Dec. A small epiphyte, endemic, 2c, 4f, 5g.

Eria bidens, *Ridl.* 2000-4500', Ridl. 2883, Anders. 46; flr. March. An epiphyte, endemic, 4f, 5g.

Eria brucea, *Ridl.* At about 2500', Ridl., Long; flr. June. An epiphyte, endemic, 6g, 5h, 9m.

Eria densa, *Ridl.* 4500-4700', Derry, H. & N. 2472, B. & H.; flr. Feb., Sept. An epiphyte of Borneo; in Peninsula 2c, 5g.

Eria ferox, *Bl.* 300-4200', Kunstl. 3360, Curt. 1325, Ridl. 5192, H. & N. 2364, Anders. 30; flr. Feb., March, June, Sept., Dec. An epiphyte or rock plant of W. Malaysia; in Peninsula 2c, 6e, 4f, 5g.

Eria floribunda, *Lindl.* 3000-4700', Curt., Ridl., H. & N. 2464, Anders. 43, B. & H. 12597 (var.), 12654; flr. Feb., March, Dec., fruit March. A small epiphyte of Malaysia; in Peninsula 1b, 2c, 6e, 5g, 5h, 5j, 9l, 9m.

Eria larutensis, *Ridl.* Taiping Hills, Curt. and Derry 3712, fide Ridl. An epiphyte, endemic and local.

Eria longifolia, *Hook. fil.* 2000-4500', Ridl.; flr. June, fruit Feb. An epiphyte of Sumatra and Borneo; in Peninsula 6e, 4f, 5g, 6g.

Eria major, *Lindl.* 2500-4500', Kunstl. 3311, Ridl., Derry, Hervey; flr. June, Sept. An epiphyte of Borneo and the Philippines; in Peninsula 4b, 4f, 5g, 6g.

Eria monticola, *Hook. fil.* Larut Hills, Curt.; flr. Aug. An epiphyte, endemic, 2c, 6e, 5g, 5h, 6j, 7k, 0k.

Eria pilifera, *Ridl.* 2500-3700', Ridl. 2887, B. & H. 13003; flr. March. An epiphyte of Sumatra; in Peninsula 5g.

Eria poculata, *Ridl.* At about 4500', Ridl. 2884; flr. Feb. An epiphyte, endemic, 2c, 6e, 5g, 7k, 9k.

Eria ramulosa, *Ridl.* Taiping Hills, Long; flr. March. A creeping epiphyte, endemic and local.

Eria teretifolia, *Griff.* At about 4000', Curt., Ridl.; flr. March, Sept. A small epiphyte of Borneo; in Peninsula 2c, 2d, 6e, 4f, 5g, 6k, 7k.

Eria vestita, *Lindl.* At 4700', B. & H. 12630; flr. March. An epiphyte of Borneo; in Peninsula common.

Phreatia listrophora, *Ridl.* 2500-4000', Ridl.; flr. June. A small epiphyte, endemic, 1b, 6e, 5g.

Phreatia minutiflora, *Lindl.* At about 3500', *Ridl.* A small epiphyte, widely Malaysian; in Peninsula 5h, Johore, 9m.

Phreatia myosurus, *Lindl.* *Phreatia densiflora*, *Lindl.* 3000-4500', *Kunstl.* 6923, *Ridl.*, *Anders.* 4; flr. Feb., March, Dec. A small epiphyte of W. Malaysia and the Philippines; in Peninsula 5h.

Agrostophyllum bicuspidatum, *J. J. Sm.*, *Podochilus callosa*, *Schl.* 3000-4500', *Ridl.*, *Anders.* 44, B. & H. 12555; flr. March, June. An epiphyte of Tenasserim and W. Malaysia; in Peninsula common.

Agrostophyllum majus, *Hook. fil.* At 2000', *Ridl.*; flr. Feb. A tufted epiphyte of Sumatra and Borneo; in Peninsula 2d, 4f, 8l, 9l, 9m.

Ceratostylis cryptantha, *Ridl.* At about 2500', *Ridl.*; flr. and fruit June. A small epiphyte, endemic, 2d, 5g.

Ceratostylis pendula, *Hook. fil.* 300-500', *Kunstl.* 3847; flr. Feb. A small epiphyte of Borneo to the Philippines; in Peninsula 2d, 5h, 8h, 7l.

Ceratostylis puncticulata, *Ridl.* At about 4500', *Ridl.*; flr. June. A small epiphyte, endemic and local.

Ceratostylis subulata, *Bl.* 4000-4500', *Curt.*, *Fox* 138, *Ridl.*, B. & H. 12752; flr. March, Sept., Oct. A small epiphyte of Java; in Peninsula common.

Chrysoglossum villosum, *Bl.* Taiping Hills, *Scort.*, *fide Ridl.* A terrestrial herb of Java; in Peninsula 3e only.

Collabium nebulosum, *Bl.* 4200-4500', *Haniff* 9089, *Derry*, B. & H. 12757; flr. March, Oct. An epiphyte of Java; in Peninsula 4f.

Diglyphosa latifolia, *Bl.* Taiping Hills, *Anders.* 178; flr. March. A terrestrial herb of Java; in Peninsula 3e only.

Plocoglottis javanica, *Bl.* 3000-4000', *Curt.*, *Ridl.*; flr. June, Sept. A terrestrial herb of Java and Borneo; in Peninsula common.

Tainia atropurpurea, *Ridl.* At 2000', *Curt.* 2308; flr. May. A terrestrial herb of Himalaya; in Peninsula 2d, 4f.

Ascotainia penangiana, *Ridl.* At about 4000', *Curt.*; flr. Dec. A terrestrial herb of Java and Amboina; in Peninsula 2d.

Nephelaphyllum pulchrum, *Bl.* ? Larut Hills, *Curt.* A terrestrial herb of Indo-Malaya; in Peninsula 4e, 6e, 3f, 4f, 6j, 6k, 7k, 9m. *Curtis'* specimen is without locality, but *Ridley* in the "Materials" quotes a specimen from the Larut Hills without mentioning the collector.

Spathoglottis aurea, *Lindl.* 2000-4500', *Ridl.*, B. & H. A terrestrial herb of W. Malaysia to the Philippines; in Peninsula common in the hills.

Spathoglottis plicata, *Bl.* 100-3000', Kun tl. 3268, Ridl., Hend. 10023, 10112, B. & H.; flr. Jan., Feb., Aug. A tall herb, widely Malaysian; in Peninsula common.

Phaius callosus, *Lindl.* 2500-4000', Wray 2986, Kunstl. 6412, Curt., Ridl. 5191; flr. June, Aug., Sept. A large terrestrial herb of Sumatra (a var.) and Java; in Peninsula 4c, 5g.

Phaius pallidus, *Ridl.* 3000-4000', Ridl., Curt. 2064; flr. June, Sept. A terrestrial herb of Sumatra; in Peninsula 6c, 6f, 5g, 5h.

Calanthe albolutea, *Ridl.* At about 4000', Ridl., Derry; flr. Oct. A large terrestrial herb, endemic, 2c, 6c, 4f, 6g.

Calanthe angustifolia, *Lindl.* At 4700', Kunstl. 5054, Curt. 2066; flr. Sept. Oct. A terrestrial herb of Sumatra and Java; in Peninsula 2c, 4f, 5g, 6g.

Calanthe Ceciliae, *Rehb. fl.* Larut Hills, Anders 130; flr. March. A terrestrial herb of Java; in Peninsula 4c, 6c, 4f, 6g, 5h, 5j, 6k.

Calanthe curculigoides, *Lindl.* 2500-4000', Wray 2809, Curt. 2065; flr. Sept. A terrestrial herb of Sumatra and Java; in Peninsula 1b, 2d, 4f, 7k, 8l, 9l, 9m.

Calanthe Foerstermanni, *Rehb. fl.* 3800-4000', Curt., Ridl., B. & H. 13006; flr. March, June, Sept. A terrestrial herb of Assam; in Peninsula 3e only.

Calanthe veratrifolia, *R. Br.* 4000-4500', Ridl., Hervey; flr. June. A terrestrial herb of Indo-Australia; in Peninsula 4f, 6g, 4h, 5h, 6j, 9l, 8m, 9m.

Arundina revoluta, *Hook. fl.* At 300', Wray 1979, Ridl. 2882; flr. Feb., fruit Feb., June. A tall woody herb, a var. only in Borneo; in Peninsula 3e only.

Dilochia Wallichii, *Lindl.* At 4000', Curt., Derry; flr. Jan., Oct. An epiphyte of W. Malaysia; in Peninsula 6j, 9m.

Coelogyne asperata, *Lindl.* 300-1000', Kunstl. 7287; flr. Feb. A large epiphyte of Sumatra, Borneo and N. Guinea; in Peninsula 4d.

Coelogyne carnea, *Hook. fl.* 4000-4500', Hose 41, Anders. 57; flr. March, Aug. An epiphyte, endemic, 3d, 4c, 6c, 4f, 5g, 6g, 5h.

Coelogyne Cumingii, *Lindl.* Larut Hills, Derry. Waterloo, Elphinstone; flr. Aug. A rock plant or epiphyte, endemic, 6c, 6f, 7k, 70k, 9m.

Coelogyne Dayana, *Rehb. fl.* 4000-4700', Kunstl. 6492, Curt., Ridl., Derry, Anders. 58, B. & H. 12596; flr. March, June, Aug. An epiphyte or rock plant of Sumatra and Borneo; in Peninsula 2d, 3d, 6c, 4f, 6g, 5h, 7k.

Coelogyne Kingii, *Hook. fl.* Larut Hills, Kunstl., Derry, fide Ridl. An epiphyte, endemic, 5j.

Coelogyne longibractata, *Hook. fl.* At 4700', Derry, B. & H. 12628; flr. Feb., March. An epiphyte, endemic, 3d, 6c, 5g, 5h, 5j, 9l.

Coelogyne pallens, *Ridl.* 2000-4000', (Curt., Ridl., H. & N. 2324, B. & H. 12708; fr. Feb., March, Dec. An epiphyte, endemic, 2c, 4f.

Coelogyne perakensis, *Rolfe*. 3000-4500', (Curt. 2068, Ridl., Derry, Anders. 53; fr. March, Aug., Sept. An epiphyte, endemic, 4f, 5g, 6g, 9m.

Coelogyne pusilla, *Ridl.* At about 4500', (Curt. 2063, Ridl.; fr. Sept. An epiphyte of Java; in Peninsula 3e only.

Coelogyne quadrangularis, *Ridl.* At about 4500', Ridl.; fr. July. An epiphyte? of Borneo; in Peninsula 3e only.

Coelogyne Rochusseni, *De Tr.* At 100', Kunstl. 6794; fr. Nov. An epiphyte of W. Malaysia; in Peninsula common.

Coelogyne speciosa, *Lindl.* 3000-4500', Ridl. 5198; fr. March, June. An epiphyte of Java and Borneo; in Peninsula 2d, 4e, 6e, 4f, 5g, 5h, 6j, 9l, 9m.

Pholidota parviflora, *Hook. fil.* 2500-4700', Ridl., Derry, H. & N. 3245, B. & H. 12957; fr. Feb., March, Dec. An epiphyte, endemic, 3d, 4e, 6e, 4f.

Claderia viridiflora, *Hook. fil.* At 2000', Ridl., B. & H. 12831; fr. Feb. A terrestrial herb of Sumatra and Borneo; in Peninsula 2d, 6e, 3f, 4f, 5j, 6k, 8k, 7l, 9l, 9m.

Cymbidium acutum, *Ridl.* Taiping Hills, Ridl. (not seen). At Waterloo, Elphinstone; fr. Aug. An epiphyte of Himalaya and Assam; in Peninsula 3e only.

Dipodium pictum, *Rehb. fil.* At about 2000', (Curt.; fr. June. A climber on trees, of W. Malaysia; in Peninsula 6e, 4f, 5g, 6k, 7k, 9m.

Grammatophyllum stapeliiflorum, *J. J. Sm., Cymbidium Huttoni*, *Hook. fil.* At Taiping, Derry, Stephens. An epiphyte of Sumatra, Java and Celebes; in Peninsula 3e only.

Bromheadia brevifolia, *Ridl.* Larut Hills, Ridl. (not seen). A herb of Borneo; in Peninsula 3e only.

Bromheadia palustris, *Lindl.* 100-300', Ridl., Hend. 10141; fr. Feb. A tall herb of Indo-Malaya; in Peninsula 2e, 5e, 2d, 6k, 7k, 7l, 9l, 9m.

Adenoccos virens, *Bl.* At about 3000', Ridl.; fruit June. A small epiphyte of W. Malaysia; in Peninsula 4e, 5h, 5j, 9m.

Doritis Wightii, *Benth.* Taiping Hills, Stephens. An epiphyte of India to Lower Siam; in Peninsula 1b, 4d, 5j, 0j, 6k.

Renanthera elongata, *Lindl.* At 300', Wray, fide Ridl. A large herb of Java and Borneo; in Peninsula 2d, 3f, 4f, 6k, 7l, 9m.

Trichoglottis scaphigera, *Ridl.* At Waterloo, Curt., fide Ridl. A tall herb, endemic, 4a, 2d.

Saccolabium bigibbum, *Hook. fil.* At about 4500', Ridl. An epiphyte of Burma; in Peninsula 4e, 6e, 6g, 5h.

Saccolabium ionosmum, *Ridl.* At about 3000', *Ridl.*; flr. June. An epiphyte, endemic and local.

Saccolabium perpusillum, *Hook. fil.* At Taiping, in orchards, *Curt.*; flr. and fruit Oct. A small epiphyte, endemic, 5h, 6k, 9m.

Saccolabium secundum, *Ridl.* At 4000', *Hervey.* A large epiphyte of Indo-Malaya; in Peninsula 1b, 2d, 5j, 6k, 7l.

Microsaccus javensis, *Bl.* At 3800', *B. & H.* 12563; fruit March. A small epiphyte of Burma, Siam and Java; in Peninsula 4h, 5h, 9m.

Taeniophyllum serrula, *Hook. fil.* Larut, *Kunstl.*, fide *Ridl.* An epiphyte endemic, 1a, 2d, 6d, 4e, 8f, 8g, 5h, 8h, 9l, 9m.

Ascochilus hirtulus, *Ridl.* Larut, *Kunstl.*, fide *Ridl.* A small epiphyte, endemic, 1b, 2d, 6d, 6g, 5h, 5j, 6k.

Aerides odoratum, *Lour.* At 200', *Hend.* 10150; flr. Feb. An epiphyte of Indo-Malaya and China; in Peninsula 1b, 2c, 2d, 5h, 6k, 0k.

Thrixspermum arachnites, *Rehb. fil.* At Taiping, *Bishop Hose*; flr. Feb. An epiphyte of W. Malaysia; in Peninsula 2d, 3f, 4f, 5h, 7l, 9l, 9m.

Thrixspermum lilacinum, *Rehb. fil.* At Taiping, *Ridl.* At 4000', *Ridl.* (var. *montanum*), (not seen). A terrestrial herb of Java and Borneo; in Peninsula common in grassy swamps, the var. at 4f.

Thrixspermum pardale, *Schltr. Dendrocolla pardalis*, *Ridl.* Larut, *Kunstl.*, fide *Ridl.* An epiphyte of Borneo; in Peninsula 4d, 6d, 4f, 6f, 7g, 8g.

Thrixspermum pauciflorum, *Ridl.* At 3000', *Scort.*, fide *Ridl.* An epiphyte?, endemic and local.

Acriopsis javanica, *Reinw.* 2000-4500', *Ridl.*, *Anders.* 56; flr. March. An epiphyte, widely Malaysian; in Peninsula common.

Thecostele maculosa, *Ridl.* At Taiping, *Ridl.* An epiphyte of Borneo; in Peninsula 2c, 6e, 6k.

Thecostele secunda, *Ridl.* At Taiping, *Ridl.* An epiphyte of Borneo; in Peninsula 4f.

Thecostele Zollingeri, *Rehb. pl.* At Waterloo, *Curt.* 23¹ 8, 2379; flr. May. An epiphyte of Tenasserim and Borneo; in Peninsula 2d.

Appendicula anceps, *Bl. Podochilus anceps*, *Schl.* 100-500', *Kunstl.* 2609; flr. and fruit Dec. An epiphyte of Java to the Philippines; in Peninsula common.

Appendicula cornuta, *Bl. Podochilus cornuta*, *Schl.* Taiping Hills, *Ridl.* An epiphyte of Indo-Malaya and China; in Peninsula common.

Appendicula lancifolia, *Hook. fil. Podochilus lancifolia*, *Schl.* 3800-4400', *Fox* 154, *Ridl.* 2886, *B. & H.* 12564; flr. Oct., fruit March. An epiphyte, endemic, 4b, 4f, 5h.

Appendicula muricata, *Tey. and Binn. Podochilus muricata*, *Schl.* At 3200', B. & H. 12701. An epiphyte, endemic, 2c, 4f, 5g, 5h.

Appendicula torta, *Bl. Podochilus torta*, *Schl.* At about 2500', *Ridl.*; fr. June. An epiphyte of Java and Borneo; in Peninsula 6e, 5h, 9l.

Appendicula undulata, *Bl. Podochilus unciferus*, *Hook. fil.* 2400-4000', *Curt.* 2062, *Fox* 121, *Ridl.*, *Derry*, *Anders.* 145. II. & N. 2470, B. & H. 12979; fr. Feb., March, June, Sept., Oct. An epiphyte of W. Malaysia to the Philippines; in Peninsula 4e, 6e, 4f, 6g, 5h.

Podochilus tenuis, *Lindl.* 100-300', *Curt.*, *Ridl.*; fr. Oct. A moss-lile epiphyte of W. Malaysia; in Peninsula 2c, 2d, 4d, 4e, 6e, 4f, 5g.

Thelasis macrobulbon, *Ridl.* At about 2500', *Ridl.*; fr. June. An epiphyte, endemic, 4f, 5h.

Oxyanthera elata, *Hook. fil.* At Taiping, *Ridl.* A stemless epiphyte of W. Malaysia to the Philippines; in Peninsula 2c, 2d, 4f, 5g, 6g, 8g, 5h, 8h, 9m.

Vanilla Griffithii, *Rchb. fil.* Taiping Hill, *Stephens.* At 3500', B. & H.; fr. Sept. A climbing shrub of Siam to the Carimon Is.; in Peninsula common.

Galeola pterosperma, *Schltr. Galeola Hydra*, *Rchb. fil.* 200-4000', *Curt.* 2070, *Ridl.* 2889; fr. March, Sept., Oct. A leafless saprophyte of Indo-Malaya; in Peninsula common.

Aplostellis flabelliformis, *Ridl.* At Taiping, *Wray*, *fide Ridl.* A tuberous herb of Indo-Malaya; in Peninsula 1a, 2b, 6f.

Aphyllorchis pallida, *Bl.* At 4300', *Fox* 142, *Ridl.*; fr. Feb., Oct. A leafless saprophyte of Java and Borneo; in Peninsula 2d, 3d, 4d, 4e, 6e, 4f, 9m.

Corymbis longiflora, *Hook. fil.* 300-4500', *Kunstl.* 6988, *Curt.*, *Ridl.*; fr. June, Dec., fruit March. A terrestrial herb of Indo-Australia and Africa; in Peninsula common.

Tropidia curculigoides, *Lindl.* At about 3000', *Ridl.* 5195, 11416; fr. Dec. A terrestrial herb of India and Borneo; in Peninsula common.

Physurus latifolius, *Bl.* At about 3000', *Curt.*; fr. June. A terrestrial herb of Java; in Peninsula 3e only.

Cystorchis variegata, *Bl.* At Batu Kurau, *Curt.*; fr. Oct. A small terrestrial herb of Java and Borneo; in Peninsula common.

Anoectochilus albolineatus, *Gar. and Rchb. fil.* At Taiping, *Derry*, *fide Ridl.* A small terrestrial herb of India and Burma; in Peninsula 5h.

Anoectochilus ?calcaratus, *Ridl.* At 4000', *Anders.* 69; fr. March. (Determination doubtful). A terrestrial herb, endemic and local.

Anoetochilus geniculatus, *Ridl.* Maxwell's Hill, Wray, side *Ridl.* A small herb, endemic, 6k, 7k, 9l, 9m.

Anoetochilus macranthus, *Ridl.* 2000-3000', (Curt., *Ridl.*; fr. Dec. A small terrestrial herb, endemic, 9k.

Anoetochilus pectinatus, *Ridl.* 2500-4700', (Curt., *Ridl.* 5195, B. & H. 12758, 12895; fr. Feb., March, June. A terrestrial herb, endemic and local.

Anoetochilus Reinwardtii, *Bl.* 2500-3000', *Ridl.*; fr. June. A small terrestrial herb of Sumatra and Java; in Peninsula 2c, 2d, 4f, 5g.

Goodyera gracilis, *Hook. fil.* 4000-4700', *Ridl.*, Derry, B. & H. 12641; fr. March, June, Oct., fruit March. A small terrestrial herb, endemic and local, a var. only in 5h.

Hylophila lanceolata, *Hook. fil.* At 3600', H. & N. 2336; fr. and fruit March. A terrestrial herb of Sumatra and Java; in Peninsula 4f.

Hylophila mollis, *Lindl.* Taiping Hills, *Ridl.*; fr. Aug. A terrestrial herb of Sumatra; in Peninsula 6k, 9m.

Lepidogyne longifolia, *Bl.* At 2500', B. & H. 13210; fr. March. A large terrestrial herb of Sumatra, Java and the Philippines; in Peninsula 2d, 8m.

Cryptostylis arachnites, *Hassk.* At about 3000', *Ridl.*; fr. June. A terrestrial herb of Indo-Malaya to the Philippines; in Peninsula common.

Habenaria gigas, *Hook. fil.* At about 3000', Curt.; fr. June. A tall herb, endemic, 4f, 5h.

SCITAMINEAE.

Globba albiflora, *Ridl.* At Taiping, *Ridl.*; fr. Aug. A herb up to 3', endemic, 2d, 8d, 4e.

Globba aurantiaca, *Miq.* 500-4000', *Ridl.*, Hervey, B. & H.; fr. March. A herb of Sumatra and Borneo; in Peninsula common.

Globba brachycarpa, *Baker.* 2000-4000', *Kunstl.* 2414, Curt. 2703, *Ridl.* 2956; fr. March, Sept., Oct. A slender herb, endemic and local.

Globba cernua, *Baker.* 500-4000', *Ridl.* 14429, Hervey, Anders. 86, 136, *Hend.* 10097, 10118, B. & H. 12852; fr. Jan., March, fruit Aug. A herb, endemic and common.

Globba leucantha, *Miq.* 300-1500', *Kunstl.* 2291, *Hend.* 10456; fr. Sept. A herb of Sumatra; in Peninsula 3f, 4f, 8l, 9l, 9m.

Globba panicoides, *Miq.* 100-800', *Hend.* 10006, 10176, 10190, 10445; fr. Jan., June. A herb up to 2', of Sumatra and Borneo; in Peninsula common on the west.

Globba pendula, *Roab.* 2000-4000', Ridl. 2957, 14428, B. & H. 12773; fr. March, Aug., June. A herb of Tenasserim and Lower Siam; in Peninsula 2c, 2d, 4d, 4e, 6a, 6f, 5g.

Globba uliginosa, *Miq.* At Maxwell's Hill, Ridl.; fr. March. A herb up to 2', of Sumatra; in Peninsula common.

Globba variabilis, *Ridl.* 300-1000', Kunsth. 2051; fr. July. A herb up to 2', of Langga and Borneo; in Peninsula common.

Globba Wallichii, *Baker.* At 4000', Fox. 136, Anders. 144; fr. March, Oct. A herb up to 2', endemic, 2d.

Hedychium longicornutum, *Baker.* Larut Hills, Ridl.; fr. June. An epiphyte of Sumatra; in Peninsula common.

Camptandra parvula, *Ridl.* 400-4500', all collectors; fr. Jan.-March, Sept. A small herb, endemic and common.

Gastrochilus albo-sanguinea, *Ridl.* Larut Hills, Woolridge, fide Ridl. A small herb, endemic, 1b.

Gastrochilus minor, *Baker.* Larut, Kunsth., fide Ridl. A small herb, endemic, 4d, 4f.

Curcuma Kunstleri, *Baker.* 100-1500', Kunsth. 2542, Curt. 2719; fr. May, Nov. A herb, endemic, 2d, 3d, 4d, 4e, 3f, 4f.

Conamomum citrinum, *Ridl.* 300-4500', Ridl. 2959, 14447, Anders. 40; fr. March, fruit Aug. A large herb of Lower Siam; in Peninsula 4e, 4f.

Conamomum utriculosum, *Ridl.* 2000-4000', Curt. 2714, Ridl. 5190, Anders. 139, B. & H. 12955; fr. March, May, June. A large herb, endemic, 6e, 4f.

Costus globosus, *Bl.* Up to about 2500', Ridl., Curt.; fr. May, June. A herbaceous plant up to 8', of W. Malaysia; in Peninsula common.

Costus Kingii, *Baker.* 300-1500', Kunsth. 2104, Curt.; fr. May, July. A herbaceous plant up to 6', endemic, 2d, 4d.

Costus Kunstleri, *King.* 500-1000', Kunsth. 2307; fr. July. A tall herb, endemic and local.

Costus speciosus, *Nm.*, var. *argyrophyllus*, *Wall.* At Taiping, Scott. 436; fruit April. A herbaceous plant up to 10', widely Malaysian, the var. in Pegu; in Peninsula common.

Zingiber aromaticum, *Valeton.* At 300', Kunsth. 2163; fr. Aug. A herb of Java; in Peninsula common, cultivated and in waste ground.

Zingiber chrysostachys, *Ridl.* 100-4000', Curt. 2716, Ridl. 5199, Hervey; fr. May, June. A herb up to 2', endemic, 4d.

Zingiber gracile, *Jack.* 3000-3600', Ridl. (var. *elatio*), B. & H. 12712; fr. June. A herb, endemic and common, the var. in 2d.

Zingiber Kunstleri, *King.* 2000-4300', Ridl. 11449, 11962, B. & H. 12765; fr. Feb., March, Dec. A large herb, endemic and local.

Zingiber spectabile, *Griff.* At 300', Kunstl. 3205; flr. Aug. A herb up to 7', of Sumatra; in Peninsula common.

Amomum lappaceum, *Ridl.* 2000-3000', *Ridl.*; fruit Feb., June. A herb up to 6', endemic, lf, 5h, 0k.

Amomum perakense, *Ridl.* At 2500', *Ridl.*; flr. June, fruit Dec. A herb, endemic and local.

Amomum uliginosum, *Koen.* 100-1000', Kunstl. 1839, *Ridl.*; flr. March, June. A herb up to 5', of Siam and Borneo; in Peninsula common.

Amomum xanthophlebium, *Baker.* 500-1000', Kunstl. 1957; flr. June. A herb up to 6', endemic, common.

Hornstedtia albomarginata, *Ridl.* 2000-3800', *Ridl.*, B. & H. 12981; flr. March, June, Dec. A herbaceous plant up to 10', endemic, 2d, 6d, 3f, 4f, 4h 5h, 6j.

Hornstedtia fulgens, *Ridl.* Larut Hills, *Ridl.* (not seen). A herbaceous plant up to 15', endemic and local.

Hornstedtia grandis, *Ridl.* 3000-4000', *Ridl.* 11450, B. & H. 12651; flr. March, June, Dec. A herbaceous plant up to 15', endemic, 4f, 5g.

Hornstedtia imperialis, *Ridl.* 100-300', Kunstl. 3075, *Ridl.*, Hend. 10139, 10159, 10312; flr. Feb., April, June, Aug. A herbaceous plant up to 15', of Sumatra and Java; in Peninsula cultivated.

Hornstedtia macrochilus, *Ridl.* 500-3000', Kunstl. 1397, *Curt.*; flr. June, Sept. A herbaceous plant up to 12', endemic, 6d, 4f, 6k, 7l, 9l.

Hornstedtia megalochilus, *Ridl.* 100-2000', Kunstl. 2933, *Ridl.*; flr. April. A herbaceous plant up to 15', of Lower Siam; in Peninsula common.

Hornstedtia metriochilus, *Ridl.* 2000-3000', *Curt.*, *Ridl.*, Anders. 137; flr. March, May, June. A herbaceous plant up to 12', endemic, 2d, 6d, 4e, 5h, 6k, 7l, 8l, 9l.

Hornstedtia scyphus, *Retz.* At 1000', *Curt.* 2072; flr. Sept. A herbaceous plant up to 10', of Sumatra and Borneo; in Peninsula 4h, 5h, 7l, 9m.

Hornstedtia triorgyale, *Ridl.* 200-300', Kunstl. 2105; flr. July. A herbaceous plant up to 20', endemic, 6d, 6g, 5h.

Elettariopsis latiflora, *Ridl.* 800-1500', Kunstl. 2886; flr. March. A creeping herb, endemic, 2c, 4f, 5h, 6k, 8k, 9m.

Geostachys decurvata, *Ridl.* 3000-4000', Kunstl. 6310, *Ridl.* 5189, Anders. 60; flr. June, July, fruit March, July. A large-tufted plant, endemic and local.

Alpinia javanica, *Bl.* At 100', Kunstl. 2296, at Waterloo, *Ridl.* 2954; flr. Sept., fruit March. A herb up to 6', of Sumatra and Java; in Peninsula common.

Alpinia macrostephanus, *Ridl.* 500-1000', Kunstl. 1905; flr. June. A herb up to 8', endemic and local.

Alpinia mutica, *Rorb.* At 100', Kunstl. 2581; flr. Nov. A herb up to 6', of Borneo; in Peninsula 2d, 0k.

Alpinia petiolata, *Baker.* 2000-4000', Kunstl. 6357, Curt., Ridl.; flr. June, July, Sept., Dec. A herb up to 3', endemic, 6: 4f, 5g, 6k.

Alpinia Rafflesiana, *Wall.* 100-1000', Curt. 2074, 2985, Ridl., Anders. 113, Hend. 10007, 10078, 10096, 10455; flr. Jan., March, Sept., Oct. A herb up to 4', endemic and common.

Alpinia scabra, *Benth.* 2000-3000', Kunstl. 2818, Curt. 2722, Anders. 141, Hend. 10117, B. & H. 12692; flr. Jan., March, May, Dec. A herb up to 6', of Java; in Peninsula common.

Donax grandis, *Ridl.* 500-1000', Curt. 2071, Hend. 10417; flr. May, fruit Oct. A shrub up to 20', of Tenasserim to Borneo; in Peninsula common.

Phrynium hirtum, *Ridl.* At 4200', Ridl. 11452, B. & H. 12900; flr. Dec., fruit March. A stemless herb, endemic, common.

Phrynium malaccense, *Ridl.* At Maxwell's Hill, Ridl.; flr. March. A large stemless herb of Lower Siam; in Peninsula common.

Musa malaccensis, *Ridl.* Up to about 4700', Ridl. 2949 B. & H.; flr. March, Dec. A banana up to 10', endemic and common.

Musa truncata, *Ridl.* Taiping Hills, Ridl. (not seen). A big banana, endemic, 4f, 5h.

Musa violascens, *Ridl.* At 500'. Haniff 10561; flr. May. A banana up to 10', of Borneo; in Peninsula 4d, 4e, 6c, 4f, 6f, 5g, 5h, 6j.

AMARYLLIDACEAE.

Curculigo latifolia, *Dryand.* 500-1600', Kunstl. 2521, 6405, B. & H. 12642; flr. March, July, Nov. A stemless herb of Indo-Malaya; in Peninsula common.

Curculigo megacarpa, *Ridl.* 2000-3800', Ridl. 11407, B. & H. 12991; flr. Feb., Dec. A large tufted plant, endemic and local.

Curculigo recurvata, *Dryand.* At 3000', Ridl. 11421; flr. and fruit Dec. A tuberous herb of Indo-Australia and China; in Peninsula 1f, 9m.

BURMANNIACEAE.

Burmattia coelestis, *Don.* At Taiping, Hend. 10325; flr. Aug. A small herb of Indo-Australia and China; in Peninsula common.

Burmattia Disticha, *Lin.* At Taiping, Hose 44; flr. Dec. A small herb of Indo-Australia and China; in Peninsula 2c, 6e, 7k.

Burmattia longifolia, *Becc.* At 4750', Kunsth. 5039, Ridl.; flr. June, fruit Oct. An erect herb of Malaya; in Peninsula 3d, 4e.

Thismia arachnites, *Ridl.* At 2000', Ridl. (not seen). A small saprophyte, endemic and local.

Bagnisia crocea, *Becc.*, var. *brunnea*, *Ridl.* About 1700', Ridl.; flr. Feb. A very small saprophyte, the species of Borneo; in Peninsula 3e only.

TACCACEAE.

Tacca cristata, *Jack.* 200-3000', Wray 2657, Kunsth. 2174, Hendl. 10460, 10480; flr. Feb., Aug. A tuberous herb of Burma; in Peninsula common.

DIOSCOREACEAE.

Dioscorea bulbifera, *Linn.* 100-200', Wray 2669, Kunsth. 3526; flr. Aug. A climbing shrub of Africa, Indo-Australia and China; in Peninsula common.

Dioscorea deflexa, *Hook. fil.* 300-1000', Kunsth. 3858, 3972, 6568; flr. March, Sept. A wide climber of Tenasserim to Java; in Peninsula 2d, 8d, 4e, 7j.

Dioscorea glabra, *Roxb.* At 100', Wray 569 (var. *grisea*), Kunsth. 2370 (var. *grisea*), 2186. A climber of India to Siam; in Peninsula 1b, 2c, 2d.

Dioscorea hispida, *Densl.*, var. *reticulata*, *Hook.* At 300', and Bukit Gantang, Wray 1894, Kunsth. 4190; flr. May. A spiny climber of Indo-Australia; in Peninsula common.

Dioscorea laurifolia, *Wall.* 100-4700', Kunsth. 5549, H. & N. 2308, 2309, 2316, 2318, 2329, 2343, 2388, 2393, 2394, B. & H. 12862; flr. and fruit Feb. A slender unarmed climber, endemic and common.

Dioscorea orbiculata, *Hook. fil.* At 300', Wray 3251, Kunsth. 3421, 5068, B. & H. 12804. A slender climber of Sumatra and Borneo; in Peninsula common.

Dioscorea piscatorum, *Prain and Burkill.* At 200', Hendl. 10059. A thorny climber of Sumatra; in Peninsula 4e, 4f, 6f, 6g, 0j.

Dioscorea polyclades, *Hook. fil.* 300-800', Kunsth. 2980. A climbing shrub of W. Malaya; in Peninsula 5e, 4f, 5g, 5h, 5j, 6j, 8k, 9m.

Dioscorea pyrifolia, *Kunth.* 300-3600', Kunsth. 5125, H. & N. 2337, 2399. A climbing shrub of W. Malaysia; in Peninsula common.

Dioscorea Scortechinii, *Prain and Burkill.* 3000-3900', Scort., H. & N. 2307, B. & H. 12724, 12973; flr. Feb., March. A climbing shrub of Tonkin and Sumatra; in Peninsula 6k, 8l, 9l.

Dioscorea stenomeriflora, *Praun and Burkill*. 100-2000'.
Kunsth. 1160, 5152, 6693, 6716; flr. April, Nov. A climber up to
30', endemic, 5h, 9m.

LILIACEAE.

Protolirion paradoxum, *Ridl. and Groom*. Up to 4000', Wray.
Ridl. A small saprophyte, endemic, 2c, 4c, 6c, 4f, 5g.

Peliosanthes albida, *Baker*. 2000-4500', Curt., Ridl. 14448.
Hend. 10470, B. & H. 12703; flr. Feb., March, Sept. A herb of
Sumatra and Borneo; in Peninsula 2d, 5h, 6k.

Peliosanthes grandiflora, *Ridl.* Taiping Hills, Ridl. A herb,
endemic and local.

Peliosanthes violacea, *Wall.* Taiping Hills, Ridl., Anders. 121;
fruit March. A herb of Himalaya to Siam; in Peninsula common.

Peliosanthes viridis, *Ridl.* At 2000', Ridl.; fruit Feb. A bushy
herb of Sumatra; in Peninsula 6k, 7l, 9l, 9m.

Ophiopogon malayanum, *Ridl.* 2000-3000', Curt., H. & N.
2497; flr. Feb., fruit Dec. A herb of Borneo; in Peninsula 1b, 2d.

Dianella ensifolia, *Red.* 200-4750', Wray 1978, 4282. Hend.
10228, B. & H.; fruit Nov. A herb up to 6', of Indo-Australia and
the Mascarene Is.; in Peninsula common.

Dracaena conferta, *Ridl.* At 2500', Ridl. 11408, B. & H. 13034;
flr. Dec., fruit March. A shrub up to 10', of Lower Siam; in
Peninsula 2d, 3d, 26k.

Dracaena elliptica, *Thunb.* 3000-4700', Ridl., B. & H. 12592,
12665; flr. March, June, fruit March. A shrub up to 6', of Indo-
Malaya; in Peninsula common.

Dracaena granulata, *Hook. fil.* At 200', Kunsth. 6808, fide Ridl.
A tree up to 60', of ?Borneo; in Peninsula 9l, 9m.

Dracaena Maingayi, *Hook. fil.* Larut, Kunsth. 3561, fide Ridl.
A tree up to 40', of Malaysia; in Peninsula 2d, 8g, 5h, 6k, 7l, 9m.

Dracaena Porteri, *Bak.* Larut, Ridl. (not seen). A small shrub
of Siam; in Peninsula 2d, 6d, 6e, 5h, 6j, 6k, 7k, 8l, 9m.

Dracaena robusta, *Ridl.* Taiping Hills, Ridl. (not seen). A
shrub up to 9', endemic, 6d, 4e, 5g.

Dracaena umbratica, *Ridl.* At 500', Hend. 10113; flr. Jan. A
shrub up to 3', endemic, common.

Smilax aspericaulis, *Wall.* 1800-2000', Kunsth. 2924, Ridl.
11403; flr. April, Dec. A climbing shrub of India to Java, except
Sumatra; in Peninsula 5h.

Smilax barbata, *Wall.* Up to 2000', Ridl. (not seen). A thorny
climber of Bangka; in Peninsula 5h, 6k, 9m.

Smilax Blumei, *A. DC.* At 2000', Ridl. (not seen). A thorny
climber of Java; in Peninsula 4f, 6k.

Smilax calophylla, Wall. 100-3500', Kunsth. 1961, 4108, B. & H. 12711; fruit March, April, June. A slender erect shrub of Sumatra; in Peninsula common.

Smilax Helferi, A. DC. 100-500', Kunsth. 3365; flr. Sept. A woody climber of Tenasserim; in Peninsula common.

Smilax Kingii, Hook. fil. 300-800', Wray 2063, Kunsth. 4171, Hend. 10008; fruit April. A thorny climber, endemic. 6j.

Smilax laevis, Wall. 300-4500', Kunsth. 4140, Fox 139, Ridl. 2957, 11389, B. & H. 12864; flr. Dec., fruit Feb., April, Oct. A slender climber of China and Borneo; in Peninsula 2c, 2d, 1f, 5g, 5h, 7k, 9k.

Smilax leucophylla, Bl. Larut Hills, Kunsth. 3669, fide Ridl. A woody climber of Indo-China and Malaya; in Peninsula 2d, 3f, 8g, 5h, 0k, 9m.

Smilax megacarpa, A. DC. 300-1000', Kunsth. 4177, 5084; flr. Oct., fruit April. A thorny climber of India, Tonkin and Java; in Peninsula 2d, 3f, 6k, 9m.

Smilax myosotiflora, A. DC. Larut, Kunsth. 2748, fide Ridl. A slender climber of Lower Siam and Java; in Peninsula common.

COMMELINACEAE.

Pollia sorzogonensis, Endl. At 2000', Curt.; fruit May. A tall herb of Indo-Australia and China; in Peninsula common.

Pollia thyrsiflora, Endl. At 300', and Waterloo, Curt., Ridl., Hend. 10047; flr. May, fruit Jan., March. A herb of Malaysia; in Peninsula 1b, 4e, 6e, 6f, 5g, 5h, 0j.

Commelina nudiflora, Linn. 100-4000', Wray, Hervey, B. & H. 12780; flr. March. A creeping herb, pantropic; in Peninsula common.

Anilema conspicuum, Kunth. Taiping Hill, Anders. 115; flr. and fruit March. A herb of Indo-Malaya; in Peninsula 2d, 4d, 6d, 6f, 6k.

Anilema nudiflorum, Br. Taiping, Wray, fide Ridl. A creeping herb of S. E. Asia; in Peninsula common.

Floscopa scandens, Lour. At Taiping, Ridl., Hend. 10371; flr. Jan. A creeping herb of Indo-Australia and China; in Peninsula common near streams.

Forrestia gracilis, Ridl. 300-400', Hend. 10451; flr. Feb. A creeping herb, endemic and common.

Forrestia marginata, Hassk. Taiping Hills, Ridl.; flr. Feb., fruit Feb., Dec. A creeping herb of W. Malaysia; in Peninsula common.

Forrestia mollis, Hassk. At about 3000', Ridl. 2950; flr. March. A creeping herb of Sumatra and Java; in Peninsula 4d, 6e, 7k, 9k, 8l, 9l.

Forrestia monosperma, *Clarke*. 1500-2500', Curt., Ridl. A creeping herb, endemic, 4d, 6e, 4f, 5h.

ALISMACEAE.

Limnocharis emarginata, *Humb. and Bonpl.* At 200', Wray 1764. An aquatic herb of S. America. An escape from cultivation.

FLAGELLARIACEAE.

Flagellaria indica, *Linn.* At 4750', B. & H. A climbing shrub of the Old World tropics; in Peninsula common, usually near the sea.

Joinvillea malayana, *Ridl.* At 4000', Ridl. 11914, Hose 60; fruit Feb. A tall reed-like plant of Borneo; in Peninsula 4e, 4f, 5g.

Susum malayanum, *Hook. fil.* 200-3800', Wray 2128, Curt., Ridl. 11430, Hend. 10459; flr. June, Oct., fruit Feb., June, Dec. A large herb of Java and Borneo; in Peninsula common.

PALMAE.

Areca pumila, *Bl.* Larut Hills, Ridl. 11429 (not seen). A palm up to 15', of Siam and Java; in Peninsula 1b, 2d, 4e, 5g, 6j, 9m.

Pinanga malaiana, *Scheff.* At about 2000', Ridl. A palm up to 12', of Sumatra and Borneo; in Peninsula common.

Pinanga paradoxa, *Scheff.* Up to 3700', Curt., Ridl., B. & H. 12715; fruit March, Oct. A palm up to 12', endemic and common.

Pinanga polymorpha, *Becc.* 4400-4700', Ridl., B. & H. 12875; fruit Feb., June, Dec. A palm up to 3', endemic, 4f, 5g, 5h.

Pinanga Scortechinii, *Becc.* 2000-4700', Curt. 2080, Fox, Ridl., Anders. 163, B. & H. 12627; flr. Sept., Dec., fruit Feb., March, Sept., Oct. A palm up to 15', of Lower Siam; in Peninsula common.

Nenga macrocarpa, *Scort.* 3000-4500', Ridl., B. & H. 12790; flr. Feb., June, Dec. A palm up to 18', endemic and common.

Nenga Wendlandiana, *Scheff.* Taiping Hills, Ridl.; flr. Dec. A palm up to 15', of Sumatra; in Peninsula Taiping to Singapore.

Oncosperma horrida, *Scheff.* At 3200', B. & H. A palm up to 6', of Borneo; in Peninsula 2d, 6e, 4f, 6g, 6k, 9m.

Iguanura bicornis, *Becc.* 3500-4000', Kunstl. 6375; flr. and fruit July. A palm up to 8', endemic, doubtfully from 4f.

Iguanura ferruginea, *Ridl.* 2000-4000', Fox 162, Ridl. 11405; flr. Oct., Dec. A short-stemmed palm, endemic, 4f.

Iguanura geonomaeformis, *Mart.*, var. *malaccensis*, *Ridl.* Up to 2500', *Ridl.* 11404, Robertson-Glasgow; flr. Dec. A palm up to 3', endemic and common.

Iguanura polymorpha, *Becc.* 3000-4000', *Curt.* 2078, *Ridl.* 3157, *Anders.* 113, Forest Dept. C.F. 29, B. & H. 12715; flr. and fruit Feb., March, Sept. A palm up to 7', endemic, 6d, 4e, 4f, 6g.

Iguanura Wallichiana, *Hook. fil.* Up to 4000', *Fox*, *Anders.* 170; flr. March. A palm up to 12', endemic, 2d, 3d, 6e, 1f, 6f, 7k.

Arenga saccharifera *Labill.* At 3900', B. & H. A palm up to 30', of Indo-Malaya; in Peninsula common.

Arenga Westerhouti, *Griff.* Taiping Hills, *Ridl.* (not seen). A palm up to 30', endemic, 2d, 4e, 6e, 4f, 6k.

Didymosperma Hookeriana, *Becc.* At Waterloo, 1500', *Curt.*; fruit May. A dwarf palm of Lower Siam; in Peninsula 1a, 2b, 1d, 6e, 4f, 6g.

Caryota obtusa, *Griff.* Common at 3400', *Ridl.* 11401, B. & H. A palm up to 60', endemic, 4f, 5g, 6k, 9l.

Licuala longipes, *Griff.* At Maxwell's Hill, *Ridl.*; fruit June. A stemless palm, endemic, Taiping to Singapore.

Licuala malayana, *Becc.* 4000-4500', *Fox* 163, *Ridl.*, B. & H. 12589; flr. Oct., Dec., fruit March. A palm up to 7', endemic, 6e, 4f, 6g, 7h.

Licuala modesta, *Becc.* 2000-4500', *Fox*, *Ridl.*, *Hervey*, B. & H. 12551, 12873, 12948; flr. Feb., March, June, Oct. A palm up to 10', endemic and local.

Licuala pusilla, *Becc.* At about 1500', *Ridl.* 11406, 14727; flr. Feb., Aug., Dec. A dwarf palm, endemic, 6e, 1f, 4g, 5g.

Zalacca affinis, *Griff.* Larut, *Kunstl.*, fide *Ridl.* A short-stemmed palm, endemic, 2d, 3f, 6k, 8l, 9m.

Zalacca edulis, *Bl.* At 3200', B. & H. A Javanese palm, cultivated here.

Eugeissonia tristis, *Griff.* Up to about 2500', common. A tufted palm of Borneo; in Peninsula common on the West.

Daemonorops aciculatus, *Ridl.* 3000-4700', *Ridl.*, *Anders.* 176; flr. June, fruit March. A large rattan, endemic and local.

Daemonorops calicarpus, *Mart.* Larut, *Kunstl.*, fide *Ridl.* A tufted palm, endemic and common.

Daemonorops didymophyllus, *Becc.* At 3200', *Ridl.*, B. & H. 12681; flr. March, fruit Feb. A rattan up to 40' long, of Borneo; in Peninsula 2d, 4f, 7l, 9l, 9m.

Daemonorops elongatus, *Bl.* 3500-3800', *Fox*, *Ridl.*, B. & H. 12646, 12716; fruit Feb., March. A rattan of Borneo; in Peninsula common.

Daemonorops geniculatus, *Mart.* 2000-3500', *Kunstl.* 2735, *Ridl.*; flr. Feb. A rattan about 20', endemic and common.

Daemonorops hygrophilus, *Mart.* At 4300', B. & H. 12766; fr. March. A tall stout rattan, endemic, 5h, 6k.

Daemonorops hystrix, *Mart.* Larut, Kunstl. 5142, fide Ridl. A rattan up to 30', of W. Malaysia; in Peninsula common.

Daemonorops leptopus, *Mart.* Larut Hills, Ridl.; fr. Dec. A stout stemmed rattan, endemic, 4f, 5h, 6k, 9l, 9m.

Daemonorops monticolus, *Mart.* 3800-4700', B. & H. 12763, 12994; fruit March. A tufted rattan of Borneo; in Peninsula 2d, 0k, 8l.

Daemonorops periacanthus, *Miq.* At about 2000', Ridl. 11409; fr. Dec. A rattan up to 40', of Sumatra and Borneo; in Peninsula common.

Ceratolobus laevigatus, *Becc.* 2000-2900', Wray 2919, Ridl. 3488, 11436, H. & N. 2377, B. & H. 12696; fruit Feb., March, Dec. A climbing palm, endemic, 2f, 4f, 5g, 5h, 0j.

Calamus ciliaris, *Bl.* 2500-3700', Ridl., B. & H. 12771; fruit March, Dec. A rattan up to 20', of W. Malaysia; in Peninsula 6e, 8l, 9l.

Calamus Curtisii, *Ridl.* At Maxwell's Hill, Ridl.; fr. June. A stout stemmed rattan, endemic, 4f, 5g, 5h.

Calamus densiflorus, *Becc.* At Taiping, Kunstl. 5527, 8434, fide Ridl. A rattan up to 15', endemic, 8f, 5h, 9m.

Calamus Diepenhorstii, *Miq.* Taiping Hills, Ridl. 11411, 11412; fruit Dec. A rattan up to 30', of Sumatra and Borneo; in Peninsula 2d, 4d, 6e, 3f, 4f, 6j.

Calamus intumescens, *Becc.* At 2500', Ridl. (not seen). A long stemmed rattan, endemic, 5g, 7l, 9m.

Calamus longispatha, *Ridl.* At Taiping, Wray 2392, 3017, fide Ridl. A stout rattan, endemic, 4f, 5g.

Calamus luridus, *Becc.* 3500-4000', Ridl. 11987; fruit Feb. A rattan up to 20', of Borneo; in Peninsula 4f, 5g, 5h, 6j, 7k, 9l, 9m.

Calamus ornatus, *Bl.* Larut, Kunstl., fide Ridl. A rattan up to 80', of W. Malaysia and the Philippines; in Peninsula 6j, 6k, 7l, 9i, 9m.

Calamus pencillatus, *Rorb.* 200-4700', Curt., Anders. 168, B. & H. 12590, 13219, Haniff 13257; fr. May, Sept., fruit March. A rattan up to 60', of Java and Borneo; in Peninsula common.

Calamus ramosissimus, *Grijf.* 1000-3000', Curt., Ridl. 11986, H. & N. 2499, B. & H. 12688; fr. Feb., March, Sept., Dec. A rattan up to 30', endemic, 2c, 6e, 4f, 6f, 6j.

Calamus rhomboideus, *Bl.* At about 4000', Ridl. 11410; fr. Dec. A rattan up to 40', of W. Malaysia; in Peninsula 6k.

Calamus rugosus, *Becc.* 3000-4000', Curt., Ridl. 11314, 11315; fr. Feb., May, fruit Feb., Dec. A rattan up to 20', endemic and local.

Calamus viridispinus, *Becc.* 1000-1700', *Ridl.* 3194, 5203, 11113, 11985, *Anders.* 21, 167, *H. & N.* 2321, *B. & H.* 12767, 12901; flr. Feb., March, June, Dec. A rattan up to 25', endemic and local.

Korthalsia echiometra, *Becc.* At 3200', *Ridl.*; *B. & H.* 12787; flr. Murch. A rattan up to 100', of Borneo; in Peninsula 5j, 6j, 6k, 9m.

Korthalsia scroxa, *Becc.* Up to 1500', *Scort.*, *Kunstl.*, *sic* *Ridl.* A rattan up to 30', of Borneo; in Peninsula 2d.

Korthalsia scaphigera, *Mart.* 200-500', *Kunstl.* 3722; flr. Jan. A rattan up to 60', of Sumatra, Borneo and the Philippines; in Peninsula 6k, 9k, 9m.

Korthalsia tenuissima, *Becc.* At 300', *Kunstl.* 4057, *sic* *Ridl.* A slender rattan up to 100', endemic and local.

Plectocomia ?Griffithii, *Becc.* At 3900', *B. & H.* A large rattan, endemic and common.

PANDANACEAE.

Pandanus bicornis, *Ridl.* 2500-3000', *Ridl.*; fruit Dec. A shrub up to 2', endemic and local.

Pandanus bidens, *Ridl.* At 2000', *H. & N.* 2383; fruit Feb. A shrub up to 5', endemic, 4f.

Pandanus glaucophyllus, *Ridl.* At about 2500', *Ridl.*; fruit Dec. A shrub up to 12', endemic and local.

Pandanus ornatus, *Kurz.* 1000-1800', *Kunstl.* 2015, *H. & N.* 2395; flr. July, fruit Feb. A bush up to 12', endemic and common.

Pandanus ovatus, *Kurz.* 300-800', *Kunstl.* 3758, 6559; fruit Jan., Sept. A creeping shrub of Lower Siam; in Peninsula 1a, 2b, 2c, 2d, 6k, 9k.

Pandanus perakensis, *Ridl.* At Maxwell's Hill, *Ridl.*; fruit June. A shrub, endemic, 4e.

Pandanus Ridleyi, *Mart.* At 200', *Kunstl.* 6839; flr. Nov. A shrub up to 10', endemic, 5g, 5h, 6k, 7k, 9m.

Pandanus Scortechinii, *Mart.* Up to 300', *Kunstl.* 3557. A shrub up to 4', endemic and local.

Pandanus stelliger, *Ridl.* 2000-3000', *Kunstl.* 4166, *Ridl.* 11625, *B. & H.* 12700; fruit March, April, Dec. A shrub up to 10', of Borneo; in Peninsula 5g.

Freycinetia confusa, *Ridl.* At 200', *Wray* 2151; flr. June. A climber, endemic, 9m.

Freycinetia lucens, *Ridl.* 100-1000', *Kunstl.* 4003, 4091, 7578, 8523; flr. Feb.-April. A climber up to 40', endemic, 5g, 5j, 9m.

Freycinetia montana, *Ridl.* 3000-4700', *Kunstl.* 2619, *Ridl.* 5194, *B. & H.* 12557; flr. March, Dec., fruit June, Dec. A climber, endemic, 5g, 5h.

Freycinetia valida, *Ridl.* 4300-4700', *Ridl.* 11891, B. & H. 12761; flr. Feb. A climber up to 30', of W. Malaysia; in Peninsula 2d, 5h, 7k, 9m.

ARACEAE.

Cryptocoryne elliptica, *A. E. Bl.* Larut Kunstl. 3166, fide *Ridl.* An aquatic herb, endemic and local.

Arisaema anomalum, *Hemsl.* 2000-4500', Wray, Curt. 3714, *Ridl.*, Derry, Hose 29, B. & H. 12581; flr. March, June, Aug., Dec. A tuberous herb, endemic, 4f.

Arisaema Kunstleri, *Hook. fil.* At Taiping, Derry. A tuberous herb, endemic, 1a, 2d.

Arisaema Wrayi, *Hemsl.* 3000-4700', Wray 30, *Ridl.*, Derry, Hervey, Hose 30, H. & N. 2305, B. & H.; flr. Feb., March, Aug., Sept. A tuberous herb, endemic, 4f.

Amorphophallus minor, *Ridl.* Larut Hills, *Ridl.* (not seen). A large tuberous herb, endemic, 2d.

Amorphophallus sparsiflorus, *Hook. fil.* At Maxwell's Hill, Wray 111. A large tuberous herb, endemic and local.

Amorphophallus variabilis, *Bl.* Larut Hills, Kunstl., fide *Ridl.* A tuberous herb of Java, Borneo and the Philippines; in Peninsula 1b.

Colocasia esculenta, *Schott.* 3100-3800', B. & H.; flr. March. A native of Trop. Asia, now cultivated in all tropics.

Alocasia Beccarii, *Engl.* 4000-4300', *Ridl.*, Hervey, H. & N. 2350, B. & H. 12769, 13021; flr. March, fruit Feb., March, Dec. A creeping herb of Borneo; in Peninsula 4f, 5g, 5h.

Alocasia Lowii, *Hook. fil.* At 3800', B. & H. A herb of Java and Borneo; in Peninsula 2b, 2d, 6d, 4e, 5g, 5h, 0j, 9l.

Alocasia ovalifolia, *Ridl.* From 300' upwards, *Ridl.*, Hend. 10320; flr. Aug., fruit Dec. A herb, endemic, 2d, 5g, 5h, 9l.

Aglaonema Schottianum, *Miq.* At 3000', Wray 2828; flr. Aug. A stout herb of Burma, Java and Borneo; in Peninsula 1a, 1b, 2b, 2d, 6k, 0k, 9m.

Homalomena argustifolia, *Hook. fil.* At 2000', *Ridl.* A creeping herb, of Java; in Peninsula common on rocks in mountain streams.

Homalomena coerulescens, *Jungh.* At 3200', *Ridl.*, B. & H.; flr. Feb., March, Dec. A stout herb of W. Malaysia; in Peninsula common.

Homalomena Griffithii, *Hook. fil.* Taiping Hills, *Ridl.* 11421; flr. Dec. A herb of Borneo; in Peninsula 2d, 6e, 5g, 6j, 6k, 7l, 9l, 9m.

Homalomena humilis, *Hook. fil.* 300-3000', Wray 2069 (var. *velutina*), Curt., Ridl. 2952; flr. Sept., Oct. A short-stemmed herb of Sumatra and Borneo; in Peninsula 2d, 4e, 3f, 4f, 5g, 5h.

Homalomena nutans, *Hook. fil.* 100-1000', Kunsth. 2571, fide Ridl. A creeping herb, endemic and local.

Homalomena paludosa, *Hook. fil.* At 300', Kunsth. 3082; flr. June. A stout herb, endemic, 2d, 9l, 9m.

Homalomena sagittaeifolia, *Jungh.* 2000-3200', Wray, Ridl., B. & H. 12805; flr. Feb. A stout herb of Java and Borneo; in Peninsula common.

Homalomena trapezifolia, *Hook. fil.* 300-4500', Wray 1976, Ridl., Hendl. 10185, 10318; flr. June, fruit Aug. A creeping herb, endemic, 4d.

Schismatoglottis calyptrata, *Zoll. and Mor.*, var. *picta*, *Hallier*. Larut Hills, Ridl. (not seen). A herb of Indo-Malaya; in Peninsula common.

Schismatoglottis longifolia, *Ridl.* 1000-4500', Curt. 2082, Ridl., Hendl. 10089; flr. Jan., Sept., fruit March. A herb, endemic, 4d.

Piptospatha elongata, *N. E. Br.* 3000-4000', Wray 3222, Curt., Ridl., Anders. 117; fruit March, Sept. A herb of Borneo; in Peninsula common on rocks in streams.

Anadendrum montanum, *Schott.* 3000-4500', Wray 704, Ridl. A climbing epiphyte of Malaysia; in Peninsula common, usually at low altitudes.

Scindapsus Beccarii, *Hook. fil.* 100-300', Wray 2261, Kunsth. 7477; flr. April. A creeping shrub of Sumatra and Borneo; in Peninsula 8c, 3f, 8f.

Scindapsus picta, *Hassk.* 300-800', Kunsth. 6471; fruit Aug. A long slender climber of Java and Borneo; in Peninsula common.

Scindapsus Scortechinii, *Hook. fil.* 4000-4300', Ridl., B. & H. 12574; flr. March, June. A climbing shrub, endemic, 2c, 4f, 5g, 5h.

Rhaphidophora Beccarii, *Engl.* At 300', Wray 1981. A creeping shrub of Siam and Borneo; in Peninsula 2d, 4d, 6e, 4f, 5h, on rocks in streams.

Rhaphidophora crassifolia, *Hook. fil.* At 300', Wray 2260. A climbing shrub, endemic, 4f, 5h.

Rhaphidophora giganteum, *Ridl.* Larut, Kunsth. 6681, fide Ridl. A large climbing shrub, endemic and common.

Rhaphidophora gracilipes, *Hook.* Larut, Kunsth. 2102, fide Ridl. A climbing shrub, endemic, 4f.

Rhaphidophora Huegeliana, *Schott.* Taiping Hills, Ridl. 11417; flr. Dec. A climbing shrub of Java to the Philippines; in Peninsula common.

Rhaphidophora Korthalsii, *Sclott.* 3500-4400', Wray 4321, Ridl. 11419, B. & H. 12586; flr. and fruit March. A climbing shrub of Java and Borneo; in Peninsula 2d, 5g, 0k, 9m.

Rhaphidophora Kunstleri, *Hook. fil.* 500-800', Kunstl. 6796; flr. and fruit Nov. A climbing shrub up to 60', endemic, 1c, 4f, 6f.

Rhaphidophora laetivirens, *Ridl.* Larut Hills, Derry. A creeping shrub, endemic, 2d, 5h.

Rhaphidophora Lobbii, *Schott.* Larut, Kunstl., fide Ridl. A slender climbing shrub of Borneo; in Peninsula Taiping to Singapore.

Rhaphidophora Wrayi, *Hook. fil.* 3000-3600', Ridl. 2960, 11418, B. & H. 12975; flr. Dec. Fruit March. A climbing shrub, endemic, 2d, 4f, 5g.

Podolasia stipitata, *N. E. Br.* 2000-2500', (Curt., Ridl.; flr. Sept., fruit Feb., June. A creeping herb of Sumatra and Borneo; in Peninsula 3f, 8l, 9l.

Cyrtosperma lasioides, *Griff.* At Batu Kurau, (Curt., 2988; flr. Oct. A thorny aquatic herb of Borneo; in Peninsula common.

Pothos Barberianus, *Schott.* At 2500', Wray 4235 (var. Wallichii) (Curt., Ridl.; flr. Sept. A climbing herb of Sumatra and Borneo; in Peninsula 3f, 5g.

Pothos Kingii, *Hook. fil.* 300-3000', (fide Ridl.), Wray 3277. A climbing herb up to 30', endemic and local.

Pothos latifolius, *Hook. fil.* 500-2000', Wray 4236, Kunstl. 3887, 3983, (Curt. 2987, Ridl. 11420; flr. Feb., Oct., Dec., fruit Feb. A climbing herb of Malaysia; in Peninsula common.

Pothos macrocephalus, *Scort.* At Waterloo, 1000', (Curt. 2895; flr. Oct. A climbing herb, endemic, 4f.

CYPERACEAE.

Kyllinga melanosperma, *Nees.* At 4750', B. & H. 12888. A sedge of Africa, and Indo-Malaya to the Philippines; in Peninsula 9m.

Cyperus diffusus, *Vahl.*, var. *pubisquama*, *Ridl.* At Maxwell's Hill, Bishop Hose 51. A sedge up to 3', the species pantropic; in Peninsula both the species and var. common.

Cyperus Haspan, *Linn.* At 3800', B. & H. 13028. A sedge, pantropic; in Peninsula common.

Cyperus Iria, *Linn.* At Taiping, Ridl. (not seen). A sedge of the tropics and sub-tropics of the Old World; in Peninsula common.

Cyperus pilosus, *Vahl.* At Taiping, Ridl. A sedge of Africa and Indo-Australia; in Peninsula common in marshes.

Cyperus Zollingeri, *Steud.* At Taiping, Ridl. A sedge of Trop. Africa and Indo-Australia; in Peninsula common.

Mariscus Sieberianus, *Nees*. At 300', Hend. 10310. A sedge, pantropic; in Peninsula common.

Fimbristylis acuminata, *Vahl*. At Taiping, Ridl. (not seen). A tufted sedge of Indo-Australia; in Peninsula common.

Scirpus erectus, *Poir.* At Taiping, Ridl. A sedge of Asia, Australia, and N. America; in Peninsula common.

Scirpus mucronatus, *Linn.* At Taiping, Ridl. A sedge of Europe, African Islands, and Indo-Australia; in Peninsula common.

Rhynchospora aurea, *Vahl*. At Batu Kurau, Haniff 13254. A sedge up to 3', pantropic; in Peninsula common.

Actinoschoenus filiformis, *Benth.* At 300', Ridl. A sedge of Indo-Malaya; in Peninsula 2c, 2d, 6c, 7k.

Gahnia javanica, *Mor.* 1000-4750', Curt. 2079, Ridl., B. & H. A large tufted sedge of Malaysia; in Peninsula common.

Mapania humilis, *Naves and Villar.* 2000-4000', Curt. 2081, Ridl. A small tufted plant of W. Malaysia to the Philippines; in Peninsula common.

Mapania Kurzii, *Clarke.* 700-4000', Wray 1852, Curt., Ridl. 11425, B. & H. 13036. A large tufted plant, endemic, 2d, 4d, 6k.

Mapania longispica, *Ridl.* 1200-2000', Ridl. 11424, Hend. 10105, 10429. A tufted plant, endemic and local.

Mapania palustris, *Benth.* 300-400', Ridl., Hend. 10463. A large tufted plant of ?Java; in Peninsula common.

Scleria elata, *Thwaites.* Up to 4700', Ridl. A sedge up to 3', of Indo-Malaysia; in Peninsula 2d, 4d, 4f, 5g.

Scleria multifoliata, *Boeck.* At 300', Ridl. A sedge up to 3', of Indo-Malaya; in Peninsula common.

Carex cryptostachys, *Brugn.* 2000-4000', Kunstl. 8517, Ridl. 11399, Anders. 116. A sedge of W. Malaysia and China; in Peninsula 2d, 3f, 4f, 6k, 7l, 8l, 9m.

Carex perakensis, *Clarke.* 2900-3000', Ridl. 11423, B. & H. 12694. A sedge, endemic, 4f, 5g.

GRAMINEAE.

Paspalum conjugatum, *Berg.* 3800-4750', B. & H. A pantropic grass, common in the Peninsula, but probably introduced.

Paspalum scrobiculatum, *Linn.* 100-4750', Hend. 10153, B. & H. A grass, pantropic; in Peninsula common.

Isachne albens, *Trin.* 3000-4750', Wray, Ridl. 3115, 11913, Bishop Hose 58, B. & H. 12887. A grass up to 4', of Indo-Malaya and China; in Peninsula 6c, 4f, 5g.

Isachne australis, *R. Br.* At Taiping, Bishop Hose 74. A grass up to 2', of Indo-Australia; in Peninsula common.

Panicum auritum, *Presl.* 100-300', Ridl., Bishop Hose 55. A grass up to 6', of Indo-Malaya and China; in Peninsula common.

Panicum maximum, *Jacq.* At 4000', Ridl. Guinea-grass. A native of Africa, cultivated in all tropics.

Panicum muticum, *Forsk.* At Taiping, Bishop Hose 53. A grass up to 8', pantropic; in Peninsula cultivated and as an escape.

Panicum myosuroides, *Br.* At Taiping, Bishop Hose 68. A tall grass of Indo-Australia and Africa; in Peninsula common.

Panicum ovalifolium, *Poir.* At 2000', Ridl. A small grass of Trop. Africa and Indo-Malaya; in Peninsula common.

Panicum perakense, *Merrill.* At Taiping, in water, Bishop Hose 56. A grass up to 4', of Borneo; in Peninsula 4d, 8k, 7l, 9l.

Panicum pilipes, *Nees and Arn.* 300-800', Kunstl. 2787, Bishop Hose 73. A creeping grass of Indo-Australia and the Mascarene Is.; in Peninsula common.

Panicum sarmentosum, *Roeb.* 100-4500', Wray, Kunstl. 2515, Ridl., Bishop Hose 54. A tall grass of Indo-Malaya; in Peninsula common.

Ichnananthus pallens, *Munro.* At 4000', Bishop Hose 61. A grass, pantropic; in Peninsula 1b, 4f, 5g, 5h, 6k, 8l, 9l.

Thysanolaena agrostis, *Nees.* 100-4000', Bishop Hose, Hend. 10155, B. & H. 12928, 13221. A grass up to 12', of Indo-Malaysia; in Peninsula 2d, 4d, 4f, 5g.

Setaria glauca, *Beaur.* At Taiping, Bishop Hose 66, Ridl. 11402. A tufted grass, cosmopolitan; in Peninsula common.

Leersia hexandra, *Sw.* At Taiping, Bishop Hose 72. A grass up to 3', pantropic; in Peninsula common.

Leptaspis urceolata, *Br.* On G. Hijau to 4500', B. & H. A grass of Indo-Malaya; in Peninsula common in dense forest.

Imperata arundinacea, *Cyrrillo.* At 4750', B. & H. Lallang. A pantropic grass; in Peninsula very common.

Saccharum arundinaceum, *Retz.* At Taiping, Hend. 10156. A grass up to 15', of Indo-Malaya; in Peninsula common.

Pogonatherum saccharoideum, *Beaur.* At 4750', B. & H. A grass of S. E. Asia; in Peninsula 2d, 4d, 6e, 4f, 5h, 8h, 6k, 9k.

Rottboellia glandulosa, *Trin.* At Taiping, Ridl. A grass up to 6', of Indo-Australia; in Peninsula common.

Andropogon aciculatus, *Retz.* Maxwell's Hill clearing, B. & H. A grass of Trop. Asia and Australia; in Peninsula common.

Anthistiria gigantea, *Cur.* At Taiping, Hend. 10152. A grass up to 16', of Indo-Australia and China; in Peninsula common.

Sphaerocaryum elegans, *Nees.* At 4000', B. & H. 12744. A creeping grass of India and China; in Peninsula 3f, 6k, 9l, 9m.

Sporolobus indicus, Br. At 4750', B. & H. A pantropic grass; in Peninsula common.

Cynodon dactylon, Pers. At 3700', B. & H. A pantropic grass; in Peninsula common.

Phragmites Karka, Trim. At Taiping, Bishop Hose 67. A reed up to 12', of Indo-Australia and Africa; in Peninsula common.

Neyraudia madagascariensis, Hook. fil. At 300', Ridl. A reed up to 12', of Trop. Asia and Africa; in Peninsula 1b, 2b, 2d, 5j, 6k.

Eragrostis elegantula, Steud. At Taiping, Bishop Hose 64. A grass up to 4', of Indo-Malaya and S. China; in Peninsula common.

Eragrostis elongata, Jacq. At Taiping, Ridl. A grass of Indo-Australia; in Peninsula common.

Lophatherum gracile, Brugn. 4000-4500', Wray, Fox, Ridl., Hervey. A tall grass of S. E. Asia except S. India, and Japan; in Peninsula common.

Poa annua, Linn. 3700-4000', Ridl., B. & H. A small grass, cosmopolitan; in Peninsula not common.

Gigantochloa Kurzii, Gamble. At Taiping, Wray 134, fide Ridl. A bamboo of Tenasserim and Siam; in Peninsula 3f, 4f.

Dendrocalamus giganteus, Munro. Below G. Hijau, Ridl. (not seen.) A bamboo up to 100', endemic, Penang to Malacca.

GNETACEAE.

Gnetum Brunonianum, Triff. 2000-3600', Ridl. 2783, B. & H. 12710; flr. March. An erect shrub of Tenasserim and Borneo; in Peninsula common.

Gnetum funiculare, Bl. 100-200', Hend. 10241, 10323; fruit Aug., Nov. A liane of Indo-Malaya; in Peninsula common.

Gnetum Kingianum, Gamble. At Kota, Wray 2851, fide Gamble. A liane, endemic, 4f, 6j, 0j, 6k, 9m.

Gnetum Ridleyi, Gamble. At 4000', Ridl. A climbing shrub, endemic, 4f.

Gnetum tenuifolium, Ridl. At Taiping, Ridl. 14565. A slender climber of Lower Siam; in Peninsula common as far south as Malacca.

Gnetum Wrayi, Gamble. Larut, Kunstl. 5283, 6590, fide Gamble. A climbing shrub, endemic, 6c, 8g, 9m.

CONIFERAE.

Agathis alba, Foxworthy. Common from about 2500' upwards, Wray. A lofty tree of Indo-China to the Philippines; in Peninsula 2c, 2d, 6c, 5g, 7h.

RELATIVE HUMIDITY of the air at the Botanic Gardens
Singapore, from wet and dry bulb hygrometer readings
made daily at 9. a.m. during the year 1924.

Date.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	100	80	91	82	76	83	83	95	83	79	76	75
2	87	87	81	81	79	81	76	79	89	77	74	79
3	85	80	87	84	84	95	80	77	81	68	67	69
4	87	93	95	82	74	85	81	69	87	70	88	66
5	91	87	78	85	76	81	75	83	78	75	91	84
6	100	79	79	80	77	81	88	81	75	62	85	89
7	100	87	98	84	..	95	87	75	83	64	91	73
8	76	80	79	82	93	93	89	76	72	62	95	90
9	81	87	91	81	75	81	77	76	75	62	85	78
10	83	77	83	76	95	79	90	75	77	62	84	95
11	78	81	76	76	87	83	93	76	91	72	79	91
12	78	95	81	78	91	85	83	78	81	82	77	74
13	85	87	77	78	85	79	100	79	93	77	66	75
14	77	100	83	84	87	83	76	96	..	84	86	74
15	81	90	78	81	89	82	77	78	75	93	75	75
16	78	85	89	83	83	80	77	77	79	72	79	71
17	81	83	78	79	79	79	77	83	93	93	84	84
18	79	78	100	..	87	77	77	81	78	76	91	84
19	72	79	76	76	89	74	79	77	83	93	78	78
20	91	81	91	83	87	93	81	76	77	77	83	78
21	76	80	81	76	80	77	79	79	93	73	72	82
22	76	83	97	95	93	72	72	95	79	84	79	86
23	91	80	93	80	87	86	77	85	89	81	91	69
24	83	87	76	77	100	79	72	75	77	74	79	71
25	78	83	83	89	81	85	74	71	76	95	86	75
26	..	79	85	80	80	91	74	71	84	81	95	69
27	91	80	91	80	81	81	93	83	89	95	81	67
28	78	83	91	69	95	83	75	79	91	72	89	68
29	81	82	93	76	78	90	75	83	77	86	89	69
30	77	..	95	78	87	95	75	68	77	77	83	69
31	80	..	80	..	81	..	79	86	..	83	..	75
Average	83.4	83.9	85.35	80.5	84.7	83.7	80.35	79.1	82.1	77.45	82.6	76.9

Average for the year 81.7

RAINFALL

at the Botanic Gardens, Singapore, during the first half of the
year, 1924.

Readings taken at 9 a.m. and expressed in inches.

Date	Jan.	Feb.	March.	April.	May.	June.
1	2.01	trace	.30	.62	..	..
2	.22	..	.13	.08	..	..
3	.01	1.65	.35	trace	trace	1.67
4	.59	.09	1.57	.01	..	.08
5	.01	1.10	.02	.17	.13	.
6	.12	.07	.01	..	..	..
7	.32	.32	..	..	..	1.15
8	.01	1.21	..	..	1.60	.91
9	..	.87	trace	..	.09	trace
10	.32	.81	..	.01	.50	..
11	..	1.17	.36	..	.12	..
12	.61	.09	trace	..	.59	.01
13	..	3.44	trace	trace	.02	.13
14	.10	.98	..	.01	.52	.09
15	.64	2.90	trace	.11	trace	..
16	.01	.08	.25	..	.01	.01
17	..	..	.10	.18	.70	.10
18	.03	.02	2.02	..	.25	.12
19	.03	.02	.60	1.11	trace	..
20	.53	..	.11	.01	.05	.24
21	..	.02	.64	..	.10	.06
22	.08	..	.70	.80	.25	..
23	1.87	..	.07	.01	.69	trace
24	.10	..	.01	.10	.53	.01
25	..	.68	1.55	.72	.03	..
26	.01	..	1.25	.03	..	.48
27	.01	..	.14	.02	..	.13
28	..	.06	.37	..	.81	trace
29	..	1.58	trace	..	.10	.75
30	..	..	.01	.03	.53	.01
31	..	..	.03	..	.15	..
Total	7.99	17.16	10.62	4.35	7.67	6.10

RAINFALL

at the Botanic Gardens, Singapore, during the first half of the year, 1921.

Readings taken at 9 a.m. and expressed in inches.

Date	July.	Aug.	Sep.	Oct.	Nov.	Dec.
1	.01	.76	.20	..	.15	..
2	.02	.59	.51	.15	.12	.
3	.20	1.43	1.73	.29	..	..
4	trace	trace	.09	..	.11	..
5	..	..	.27	..	.04	.41
6	.09	..	..	..	.05	.17
7	.13	.42	..	..	.65	.03
8	1.20	..	..	..	.82	1.32
9	.15	..	..	..	.25	.01
10	2.54	..	.03	..	.19	.59
11	.24	..	.71	..	.06	.10
12	.01	.02	.01	.13	trace	trace
13	.45	..	.29	.12	..	.11
14	..	.04	..	trace	.07	.19
15	..	.01	.13	.02	.01	.17
16	..	trace	..	.10	.01	.
17	.03	.41	.55	1.52	.34	.49
18	..	.39	.09	trace	.06	.02
19	..	.24	3.23	.12	.06	.11
20	..	..	.01	.16	..	.02
21	.07	.10	.04	..	..	.39
22	..	1.81	.02	trace	..	.41
23	..	.08	.11	.06	1.03	.15
24	..	..	..	1.93	trace	.01
25	..	..	..	1.45	trace	..
26	..	.02	.09	.03	.07	..
27	2.57	.03	.74	1.32	.04	.09
28	.01	.13	.47	.01	1.24	..
29	..	..	.01	trace	.10	..
30	..	..	4.24	trace	..	..
31	..	.34	..	.67	..	..
Total	7.75	7.12	13.60	8.08	5.77	4.79

RAINFALL

at the head of the Waterfall Gardens, Penang during the first half of the year 1921, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	Jan.	Feb.	March.	April.	May.	June.
1	.49	..	..	2.18	.17	..
2	1.58	.05	.80	.03	.13	.67
3	..	..	.25	1.65	.50	.19
4	.04	..	..	..	.07	.01
5	.02	..	..	1.17	.10	.02
6	.06	.45	.02	.01	..	.09
7	..	..	..	..	..	.81
8	.06	.03	.17	..	..	.02
9	.02	.33	.02	..	.04	..
10	..	..	..	1.54	.09	.59
11	.38	..	.24	..	.03	..
12	.04	..	.85	.04	.33	..
13	.01	.28	.59	..	1.10	..
14	..	.01	..	..	.63	..
15	..	.01	1.55	1.20	2.65	..
16	3.25	.04	.14	5.73	.67	..
17	.20	..	..	.22	.23	..
18	..	..	.60	.02	.11	..
19	.45	..	.38	..	..	.68
20	..	..	.11	.57	.03	.03
21	..	..	.14	..	1.20	.01
22	.04	..	.41	.31	.04	.62
23	..	1.55	..	.03	.13	.68
24	..	.05	.63	1.81	.04	.79
25	..	..	4.65	.16	.02	.65
26	..	.05	..	..	..	.18
27	..	3.05	..	.87	..	.06
28	..	.70	..	..	.04	2.98
29	..	..	.86	..	.87	.83
30	..	..	..	..	..	..
31	..	..	..	..	..	..
Total	6.64	6.60	12.41	15.54	9.58	10.54

RAINFALL

at the head of the Waterfall Gardens, Penang, during the second half of the year 1924, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	July.	Aug.	Sep.	Oct.	Nov.	Dec.
1	.29	..	.67	10.25	..	..
2	.01	.02	.26	2.67	.02	.03
3	..	..	.56	..	.55	..
4	.17	..	4.57	.02	.06	.26
5	..	..	.10	.63	.90	..
6	.17	.18	..	..	1.68	.03
7	..	..	..	..	..	.03
8	.03	..	.15	..	.02	.07
9	1.81	..	..	.02	3.97	.26
10	..	..	1.68	.02	.06	..
11	..	.43	.02	.25	.44	..
12	..	.02	.14	2.40	.03	..
13	..	.04	.23	.85	1.18	.03
14	..	2.05	.26	.96	..	..
15	..	..	.40	.61	..	.07
16	..	.08	..	1.18	.03	..
17	..	.02	1.08	.55	.11	.03
18	..	..	.25	.38	.65	.02
19	..	..	.05	.58	.89	1.47
20	2.29	..	.13	..	1.10	.07
21	.30	.03	.60	..	.06	..
22	..	.03	..	..	2.45	.01
23	..	.01	.69	.96	.51	..
24	..	.07	.66	.06	.25	..
25	..	..	1.79	.35	.20	..
26	..	.01	3.59	..	.67	..
27	..	1.28	1.76	..	.04	..
28	.06	.10	.02	.05	..	..
29	..	1.45	3.93	1.70	..	..
30	1.27	1.20	.13	.07	..	.02
31	.03	.45	..	.16	..	..
Total	6.76	10.47	24.32	24.72	15.87	2.40

Summary of Rainfall 1924.

	SINGAPORE.				PENANG.			
	No. of rainy days	Amount of rain inches	mm	Longest Spell without rain	No. of rainy days	Amount of rain inches	mm	Longest Spell without rain
January	21	7.99	203	4 days.	11	6.64	168	9 days.
February	21	17.16	433	3 "	13	6.60	167	6 "
March	27	10.62	270	2 "	19	12.11	315	3 "
April	19	4.35	110	1 "	17	15.54	395	3 "
May	24	7.67	194	2 "	23	9.58	243	3 "
June	20	6.10	155	2 "	19	10.54	268	8 "
July	16	7.75	197	5 "	11	6.76	171	10 "
August	19	7.12	181	4 "	18	10.47	261	4 "
September	22	13.60	345	4 "	25	24.32	618	2 "
October	21	8.08	205	8 "	22	24.72	628	3 "
November	24	5.77	146	3 "	23	15.87	403	3 "
December	20	4.79	122	4 "	14	2.40	61	7 "
Total	254	101.00	2564		217	145.85	3698	
(Greatest amount in 24 hrs. 4.24 ins. or 108mm.					10.25 ins. or 260mm.			
" " 48 hrs. 4.42 ins. or 112mm.					12.92 ins. or 329mm.			
" " 72 hrs. 7.32 ins. or 186mm.					14.31 ins. or 364mm.			
Excessively rainy periods, more than 5 ins. having fallen in 72 hours 1 (Feb.)					6 (Mar., Apr., Aug., Sept. (2) Oct.)			
No. of days when condition persisted 1					14			
Periods of comparative drought, less than .02 ins. having fallen in 120 hours 6					6 (Jan.-Feb., Feb., June, July (2) Dec.)			
(Jan.-Feb., March, Apr., July, Oct., Nov.-Dec.)								
No. of days when the condition occurred 15					27			

Index to Vol. III.

- Abnormal flowers, 11
Arachnis brevicauda, flower of, 14
Arenga pinnata, branched, 2
Ascochilus hirsutus, flower of, 15
 Bornean flora compared, 283
 Bornean yams, 5
Bulbophyllum pustulatum, flowering of, 13
 Burkill, I. H., on branched palms, 1, 2
 on *Cleome chelidonii*, 280
 on *Haplochorema*, 18
 and M. R. Henderson, on Taiping flora, 303
 and R. E. Holtum, on *Dioscorea piscatorum*, 260
 and R. E. Holtum, on Flora of Fraser Hill, 19
 on Orchids, 12, 292
 on *Phyllocactus*, 280
 on *Stenomeris*, 289
 on Yams, 3, 4, 5, 121, 258, 260
Cleome chelidonii, 280
 Cloud and mossy forest, 246
Coclogyne celebica, flower of, 293
 cymbidioides, affinity of, 14
 speciosa, flower of, 293
 Coconut, branched palms 1, 274
 fertilisation, 261
Cocos nucifera, pollination of, 261
Cymbidium lancifolium in Penang, 14
Dendrobium albicolum in Penang, 294
 calliobotrys, flowers of, 12
 citrino-eustaneum, described, 12
 Haniffii, flowers, 295
Dietyophora indusiata, expansion of, 281
Dioscorea, 3, 4, 5, 8, 121, 258, 260
 dispersal of, 121
 distribution of in Malay Peninsula, 8
 pentaphylla, varieties of, 258
 piscatorum, 123, 260
 vernacular names of, 121
Dipterocarpus, distribution of in Malay Peninsula, 8
Elaeocarpus petiolatus, with abnormal flowers, 11
 Exploration, botanic, of Malay Peninsula, 8
 Fish-poison, 260
 Flora compared in Malaysia, 253
 Flora of Taiping, 303
 Fraser Hill, botany of, 19
 Furtado, C. X., on branched Coconuts, 274
 on Coconut fertilisation, 261
 Gunung Belumut, flora of, 245
Haplochorema sumatranum, described, 18
 Henderson, M. R., on *Semecarpus*, 290
 and I. H. Burkill, on Taiping flora, 303
 Hevea, hybrid trees, 277
 Holtum, R. E., on *Dietyophora indusiata*, 281
 and I. H. Burkill, on *Dioscorea piscatorum*, 260
 on *Elaeocarpus* flowers, 11
 on flora of Gunung Belumut, 245
 and I. H. Burkill, on Flora of Fraser Hill, 19
 on *Lycopodium*, 291
 on Mosquito larvae in *Nepenthes* pitchers, 283
 Insects on coconut flowers, 268
 Javanese varieties of *Dioscorea pentaphylla*, 258
 Kheng-fa plant, 280
 Klang, yams from, 5
 Lennon, J., on lettuces, 2
 Lettuces, races tested, 2
 Liverworts, water-holding, 255
Lycopodium in the Malay Peninsula, 291
 Malacca, yams from, 5
 Malaysia, past climate of, 20
Matonia scrub, 253
 Mosquito larvae in *Nepenthes* pitchers, 283
 Mossy forest, 27, 247
Nepenthes pitchers, mosquito larvae in, 283
Oberonia fungum-olens described, 292
 Orchid notes, 12, 292
 Pahang, yams from, 36

- Palms, branching of, 1, 2, 274
 Papuan variety of *Dioscorea pentaphylla*, 258
Paramecocarpa, a section of *Dioscorea*, 123
 Philippine flora compared 283
 variety of *Dioscorea pentaphylla*, 258
Phyllocactus Hookeri, medicinal, 280
 Poison in *Dioscorea piscatorum*, 260
 Puntius killed by *Dioscorea* juice, 260
 Rainfall in Penang, 115-118, 119, 120, 299-300, 302
 in Singapore, 111-114, 119, 120, 297-298, 302
 Scale insect, 5
Saccolabium crucicallu, described, 17
Senecarpus Curtisii var. *brevipetiolata*, described, 291
 Prainii, 291
 Seremban, yams from, 8
 Spinous roots, 3
Stenomelic tubers, 289
 Tahitian yams, 4
 Taiping, flora of, 303
 Trees, heights of, 25, 248
 Yams from Borneo, 5
 from Tahiti, 4
 in Malay Peninsula, 5
 spiny from Sumatra, 3
 vernacular names of, 121
 Vernacular names of *Dioscorea*, 121

The
Gardens' Bulletin
STRAITS SETTLEMENTS

A Journal reflecting the activities of the Botanic
Gardens of the Straits Settlements, published as
material is available.

VOLUME IV.

SINGAPORE
—
1926—1929.

DATES OF PUBLICATION.

Part 1	issued	June 15th, 1926.
Parts 2 & 3	issued	March, 1927.
Parts 4 & 5	issued	August, 1927.
Parts 6—10	issued	January, 1928.
Parts 11 & 12	issued	January, 1929.

CONTENTS.

	PAGE
No. 1.	
A List of the Mosses of the Malay Peninsula, by H. N. Dixon, M.A., F.L.S.	1
Nos. 2 & 3.	
Some Old Photographs of the Singapore Gardens . .	47
Additions to the Flora of the Malay Peninsula, by M. R. Henderson	48
A New Fern from the Malay Peninsula, by R. E. Holtum	56
Notes on Malayan Ferns, by R. E. Holtum	57
A Note Relating to the History of the Dell in the Gardens, by I. H. Burkill	69
Tulang Daing or Sisik Puyuh, by I. H. Burkill . .	77
Teratological Notes, by C. X. Furtado	78
Dioscorea tamarisciflora, Pr. and Burk., by I. H. Burkill	86
A List of Mosses Collected in the Botanic Gardens, Singapore, by R. E. Holtum	88
Addition to the List of Fraser Hill Plants, by M. R. Henderson	92
Meteorological Data, 1925	106
Nos. 4 & 5.	
Botanical Collectors, Collections and Collecting Places in the Malay Peninsula, by I. H. Burkill . .	113
The Palms of British India and Ceylon (Review) . .	203
Meteorological Data, 1926	205
Nos. 6—10.	
The Flowering Plants of Kuala Lumpur, in the Malay Peninsula, by M. R. Henderson, F.L.S. . .	211
Nos. 11 & 12.	
On some ferns from the Malay Peninsula, by Carl Christensen	375
New species of ferns from the Malay Peninsula, by R. E. Holtum	408
Additions to the Flora of the Malay Peninsula, by M. R. Henderson and C. X. Furtado	411
Ocimum, Linn., in the Malay Peninsula, by C. X. Furtado	416
Palaquium stellatum, King and Gamble, by C. X. Furtado	419
Species of Neesia in the Malay Peninsula, by C. X. Furtado	421
Anisophyllea Gaudichaudiana, Baill, is A. grandis Benth., by I. H. Burkill	426
Obituary	427
Meteorological Data, 1927	428

A List of the Mosses of the Malay Peninsula

By H. N. DIXON M.A., F.L.S.

INTRODUCTORY NOTE

Up to the present time no attempt has been made to publish a conspectus of the Moss-flora of the Malay Peninsula. Mitten's *Musci Ind. Or.* (*Journ. Linn. Soc., Bot.*, Vol. iii, Suppl.) contains some half-dozen records, the only data for which are "Malacca, Griffith." Fleischer has collected a considerable number of mosses, mostly in and around Singapore; these are recorded in the four volumes of his *Musci der Flora von Buitenzorg* (1900-1922). A short list is also given by H. J. Moeller of Straits Settlements mosses in *Hedwigia*, lx, 313, comprising some thirty species. Finally the present writer published descriptions of forty new species from the peninsula in *Bull. Torr. Bot. Club*, 51; pp. 225-259 (1924).

The great majority of entries, therefore, in the following list are unpublished records, and are based on collections made by various botanists, principally H. N. Ridley (R in the list), I. H. Burkill, R. E. Holttum, and C. H. Binstead, with other collectors from the Singapore Botanic Gardens.

The system I have followed is very largely that of Brotherus, in Engler and Prantl, *Pflanzenfamilien. Musci*, Vol. I.

The general character and relationships of the Moss-flora follow naturally very closely on the lines of the higher plants. The endemic species are comparatively few, and I think are not likely to be greatly increased; for while undescribed species are constantly collected, this is pretty well counterbalanced by the discovery of the extension of the range of supposed endemics (of Malaya) to neighbouring areas. On the other hand a very large percentage of the species have a remarkably narrow range of distribution beyond the peninsula itself, especially the Malay-Burma-Assam, Malay-Borneo, Malay-Philippines, and Malay-Java areas. It would be of some interest to give lists of these species, but it is preferable to wait till the distribution of the mosses in the peninsula itself is more completely known; the present list gives a basis for

such a conspectus, but it is only a beginning. Several of the States have been little more than sampled, for mosses, and nearly every collection that is made still contains some new record, either for the State, the Peninsula or for science. This may be illustrated by the fact that since the publication of my paper already referred to, in 1924, thirty undescribed species have come into my hands, and these appear, perforce, as "ined." in the present list.

Among special features of interest in the moss flora may be mentioned the prevalence of species of Calymperaceae (*Syrrophodon* and *Calymperes*) a most interesting and striking Family, having a peculiar distribution mostly to tropical regions, and rarely found at any great distance from the sea, though in no sense maritime plants. This is curiously contrasted with the poor representation of some of the larger genera. Thus of *Bryum* (between 800 and 900 species) six are recorded from the peninsula; of *Campylopus* (about 500 species), three; of *Macromitrium* (415 species) ten; while of *Syrrophodon* (235 species), there are thirty-one in the following list, and of *Calymperes* (200 species), twenty-four.

A further genus which is highly represented here is *Acroporium* (*Sematophyllum* Mitt. p.p.). Of about 90 known species (as the genus is understood in Brotherus, *Musci*, Ed. i), 33 are recorded for the peninsula. Here however we have to do with a genus which clearly has its principal centre of distribution in the Indo-Malay region; whereas this can scarcely be said of the Calymperaceae, which have an equally high distribution in tropical Africa, Madagascar and the Mascarene Is., tropical America, and Polynesia.

The total number of species in the following list is about 340, compared with 650 recorded from Java; and with more systematic collecting the number is certain to be very largely increased.

SPHAGNACEAE.

***Sphagnum kelantanense* Dixon sp. nov. ined.**

Kelantan: Gunong Sitong, or ridge, circa 2600 ft. (Nur 12244).

***Sphagnum cuspidatum* C. M. var. *malaccense* Warnst.**

Perak: Summit of G. Batu Puteh, 6900 ft. (Wray 902; type gathering).

Pahang: Cameron's Highlands (Henderson 22781); G. Tahan (R. 1026).

Kedah: Kedah Peak, common (Holttum 14881).

***Sphagnum junghuhnianum* Doz. and Molk.**

Selangor: Ulu Semangkok (R. 277).

Pahang: G. Tahan (R. 1038).

Kelantan: Gunong Sitong (Nur 12243).

Kedah: Kedah Peak, 3000 ft. (Holttum 14882 a).

Malacca: Gunong Ledang (Mt. Ophir) (R. 221).

Sphagnum magellanicum Brid.

Kedah: Kedah Peak, 3000 ft. (Holttum 14882 b).

The Asiatic distribution hitherto of this almost cosmopolitan species is Bhotan and Japan.

DICRANACEAE.**Wilsoniella pellucida** (Wils.) C. M.

Selangor: Batu Caves (R. 644). I have not seen this, and do not know by whom it was determined. It would seem likely that it was the same plant as the following.

DISTR. Ceylon, Java.

Wilsoniella acutifolia Broth. ined.

Selangor: Batu Caves (R. 481).

Garckea phascoides (Hook.) C. M.

"Malay Halb-insel" (Fleischer).

Singapore: Penang: (Binstead 2, 6, 11).

Kedah: Kedah Peak, 2000 ft. (Holttum 15108).

Ditrichum flexifolium (Hook.) Hampe.

Perak: Gunong Keledang (R. 701).

[*Ceratodon purpureus* (L.) Brid. It is rather curious that this peculiarly cosmopolitan species does not appear to have been collected in the Malay Peninsula].

Microdus Miquelianus (Mont.) Besch.

Perak: Tapah (R. 160).

Negri Sembilan: Perhentian Tinggi (R. 739).

Singapore: Bukit Timah (R. 300, 304); Gardens (R. 599), a small form with very narrow leaves: Singapore (Binstead 76).

Penang: Crag Hill (Binstead 4, 7).

Selangor: 15th mile, Pahang Track (Semangkok Pass) (R. 484).

Microdus macromorphus Fleisch.

Perak: Tapah (R. 160).

DISTR. Java; Borneo.

Dicranella coarctata (C. M.) Bry. jav.

Selangor: Bukit Kutu (R. 396).

Penang: Penang Hill (Chipp 4692).

Kedah: Kedah Peak 1000 ft. (Holttum 15109).

Campylopodium euphorocladum (C. M.) Besch.

Kedah: Kedah Peak, 3000 ft. (Holttum 15027).

Braunfelsia dicranoides (Doz. and Mol.) Broth.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7915 b).

DISTR. Java.

Braunfelsia enervis (Doz. and Molk.) Par.

Pahang: Fraser Hill, 4000-4370 ft., on tree trunk (Burkill and Holttum 8838); Gunong Tahan (Robinson).

DISTR. Java.

A very densely foliate, julaceous form. Neither the figure given by Dozy and Molkenboer nor that of Fleischer gives a good idea of the habit of the plant, which, judging by the specimens in our national collections, is usually much more densely foliate, with more robust branches than as depicted by these authors. The present plant is so markedly different, indeed, from these figures, that I had no doubt at all of its being a new species, prior to examining specimens of the Java plant.

Braunfelsia longipes Dixon in *Bull. Torr. Bot. Club* 51: 225 (1924).

Pahang: Gunong Tahan, 7000 ft. (Haniff and Nur 7905).

Braunfelsia plicata (Lac.) Fleisch.

Kedah: Kedah Peak, 3800 ft., on ground, in thick jungle, just below summit (Holttum 14869) c.fr.

This has hitherto been found only in a single locality in Java.

Dicranoloma Blumii (Nees) Par.

Pahang: Gunong Tahan (R. 1021); Gunong Berumban (Wray's) (Wray 1562).

Perak: Gunong Batu Puteh, 4500 ft. (Wray 300).

A rather widely distributed species, but not hitherto recorded from continental Asia.

Selangor: Ulu Semangkok (R. 281 a). There is some doubt about this specimen, which is sterile, and may possibly belong to *D. brevisetum*.

Dicranoloma Braunii (C. M.) Par.

Singapore: Herb. Mitten. Two sterile and doubtful plants, which I incline to place under this species.

Perak: leg. Curtis; herb. Singapore Bot. Garden. This specimen is labelled "*Dicranum piliferum* Mitt. MS. in sched.", but I am inclined to think that Mitten wrote "*filiferum*," in reference to the long, stout, brown articulate brood-filaments in the leaf axils, characteristic of this species. It is new to continental Asia.

DISTR. Malay Archipelago to New Caledonia and New Hebrides.

Dicranoloma reflexifolium (C. M.) Par.

Pahang: Fraser Hill (R. 283).

Kedah: Kedah Peak, 3500 ft., on ground and tree bases in dwarf forest (Holttum 14867).

DISTR. Java; Sumatra.

Dicranoloma assimile (Hampe) Par.

Pahang: Gunong Tahan (R. 1036).

The fruiting plant, so that there is no doubt of its identity.

Perak: Gunong Hijau, 4700 ft. (Wray 648).

DISTR. Java; Borneo; Mindanao; Celebes (Everett 664, in herb. II. N. Dixon).

Dicranoloma leucophyllum (Hampe) Par.Malacca: Mt. Ophir (R. 712). This is sterile, and may possibly belong to *D. assimile*.

Perak: Gunong Hijau, Taiping Hills (Anderson 314A; Burkill 12636).

Dicranoloma sumatranum Broth. ined.

Selangor: Semangkok Pass (R. 284).

DISTR. Sumatra.

Dicranoloma perintegrum Dixon in *Bull. Torr. Club* 51: 226 (1924).

Malacca: Mt. Ophir (R. 780).

Dicranoloma brevicapsulare Dixon *op. et loc. cit.*

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7915a).

Leucoloma molle (C. M.) Mitt. var. **longipilum** Fleisch.

Selangor: Bukit Hitam (R. 390).

Perak: Batang Padang (Stresemann 99).

Dindings: Lumut (R. 818a).

Penang: Penang Hill (R. 512, 574).

Leucoloma Walkeri Broth.

Kedah: Rawei I. (R. 293). A robust form, only differing in the size from the Indian and Burmese plant.

DISTR. India; Burma.

Leucoloma malayanum Dixon.

Penang: Crag Hill, on shaded granite rock (Binstead 13).

Leucoloma pallidum Dixon.

Kelantan: Gunong Sitong (Nur 12237b, 12272c).

Campylopus comosus (Hornsch. and Reinw.) Bry. jav.

Penang: Crag Hill (Binstead 8, 10, 12; Pinwell, in herb. Mitt.)

Kedah: Kedah Peak, 3000 ft., frequent on rocks and ground, usually sterile (Holtum 14896).

Campylopus serratus Lac. (*C. singaporensis* Fleisch.)

Singapore: Gardens (Larminat, in herb. Paris; Fleischer. M. Fr. Arch. Ind. et Polynes., 403: t. 611; Binstead 73, &c.). Bukit Timah (Holtum 13070).

Pahang: between Pekan and Ayer Tawar; abundant on the sandy promontory which the bridle path follows. Apparently the species used here for stuffing mattresses. (Burkill 17256); Kuantan, at base of tree (Burkill 17333b).

Kedah: Kedah Peak, on ground by path (Holtum 15028).
Form with unusually narrow upper cells.

This very marked plant must I think without doubt be Lacoste's species; it agrees exactly with the description and figures; I have also seen it from Borneo; I think that Fleischer must have overlooked this in giving it a new name. It seems to be a very characteristic plant in the Gardens at Singapore, as every collector of mosses who has visited the Gardens appears to have brought it away!

The very large genus *Campylopus* is poorly represented in the peninsula, only three species having been recorded.

***Campylopus calodictyon* Broth. ined.**

Pahang: Gunong Berumban (R. 132).

I have not seen an authentic specimen of Brotherus' plant; but Ridley's moss agrees exactly with a Bornean gathering of Binstead's, which Fleischer determined (so far as possible from the gametophyte alone) as *C. calodictyon*.

***Dicranodontium nitidum* (Doz. and Molk.) Fleisch.**

Kelantan: Gunong Sitong, on ridge, 2600 ft. (Nur 12247).

DISTR. Java; Celebes; Borneo; Philippines. Mitten records it from Ceylon. I have not examined Gardner's specimens; but a plant so named from Mitten's herbarium "Nuwara Eliya, T. W. N. Beckett" belongs to *Campylopus Vietneri* (C. M.), which throws doubt on the correctness of Mitten's determination of the earlier specimens.

***Thysanomitrium exasperatum* (Brid.) Nees.**

Malacca: Mt. Ophir (R. 228).

Pahang: Gunong Tahan (R. 1011, 1019; Haniff and Nur 7908, a very slender form, perhaps worth varietal rank).

Kedah: Kedah Peak (R. 246).

***Thysanomitrium umbellatum* W.-Arn. (*T. Plumbei* Doz. and Molk.).**

Selangor: Pahang track, 15th mile (R. 488).

***Thysanomitrium Ridleyi* Dixon in *Bull. Torr. Bot. Club*, 51: 227 (1924).**

Pahang: Gunong Tahan (R. 1019b).

Thysanomitrium abbreviatum* Dixon *op. et loc. cit.

Pahang: Gunong Tahan, c. 7000 ft. (R. 1012).

LEUCOBRYACEAE.

Leucobryum chlorophyllosum (C. M.

Pahang: Gunong Tahan (Robinson).

f. **minor** Fleisch.

Penang: Crag Hill (Binstead 14).

The species has not been recorded from continental Asia.

Leucobryum sanctum (Brid.) Hampe.

Common. I have records from at least seven States.

Leucobryum Bowringii Mitt.

Johore: Gunong Belumut, 3000 ft. (Holttum 10850).

Malacca: Mt. Ophir (R. 755).

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7973a).

Leucobryum aduncum Doz. and Molk.

Singapore: on coconut palms (Fleischer, M. Frond. Arch. Ind. 5).

Malacca: Mt. Ophir (Griffith) herb. Mitten.

Leucobryum scalare (C. M.

Singapore: Bukit Timah (Fleischer).

Penang: Crag Hill (Binstead 16, 18).

Leucobryum javense (Brid.) Mitt.

Singapore: Chan Chu Kang (R. 247).

Johore: one of the abundant ground mosses in the mossy forest of Gunong Belumut (Holttum 10696).

Pahang: Telom (R. 90); Pekan (Ridley).

Kedah: journey to Kedah Peak (Haniff 1).

Not recorded hitherto from continental Asia except from Annam, but one of the common species under certain conditions, and widely spread in Malaysia, and reaching to New Guinea.

Leucobryum sumatranum Broth. ined.

Pahang: Gunong Berumban, 5000 ft. (Henderson 11740).

A very fine species, resembling *L. javense* in habit, but of quite different structure. Only known otherwise from Sumatra.

Leucobryum stellatum Dixon.

Malacca: Mt. Ophir (R. 724).

[*Cladopodanthus speciosus* (Doz. and Molk.) Fleisch. (*Spirula speciosa* Doz. and Molk.). The only authority for this as a Malayan plant is a record by Mitten "Among moss sent with orchids to Dr. Wallace," and even the locality is not, I believe, specified. As the plant is a particularly striking one, at present only known from Java, I hesitate to include it on this vague record alone. It is quite possible that orchids, sent from the Singapore Gardens to Dr. Wallace, may have been packed in moss originally received with orchids from Java.]

[*Ochrobryum microphyllum* Card. Herzog in *Hedwig*. lxi, 295, records this as collected in Perak by Stresemann, No. 86. But as *O. microphyllum* is a South American species (*O. Gardnerianum* var. *microphyllum* Besch.), and as this group in the sterile state is a highly difficult and critical one, it appears to me that the identification must be very doubtful.]

Schistomitrium mucronifolium (A. Br.) Fleisch.

Pahang: Gunong Tahan (R. 1003). c. fr.

Kedah: Kedah Peak, 3000 ft., on a small trunk in dwarf forest, 3 ft. from the ground (Holtum 14890).

This and the preceding have leaves not falcate, thus differing from the type form; they are much too robust for *S. apiculatum*. The seta is more or less highly rugulose in both. It is quite probably a distinct species.

Schistomitrium apiculatum Doz. and Molk.

Perak: Gunong Batu Puteh, 8400 ft. (Wray 1085).

Leucophanes candidum (Hornsch.) Lindb.

Singapore: Kranji (R. 119, 256); Pasir Panjang (R. 219): no loc. (St. V. B. Down 60); etc.

Selangor: Gua Batu (R. 643); Rawang (R. 383).

Kelantan: Kuala Kalak, foot of G. Sitong (Nur 12263).

Leucophanes aciculare C. M. ined.

Singapore: Bajau, on tree at sea level, a very elongate form, in tufts 5-6 cm. high (Holtum 12277); Serangoon road (R. 206).

Leucophanes densifolium Mitt.

Singapore: Fleischer, *M. Frond. Arch. Ind. et Polynes.* 304; etc.

Johore: Tanjong Bunga (R. 338).

DISTR. Fiji and Admiralty Is.

Leucophanes albescens C. M.

Singapore: Pulau Ubin (det. Fleischer); Bot. Gardens (Holtum 16333); beim Friedhof an Baumrinde (H. Moeller).

Trengganu: Kuala Trengganu (Holtum 15188).

Kedah: Pulau Lankawi (Holtum 17478).

Leucophanes octoblepharoides Brid.

Singapore: on palms in Gardens (R. 46, 330, 593, 761); etc.

Selangor: Kuala Lumpur (R. 257).

Negri Sembilan: Ulu Bendul, on wet rocks by stream (Holtum 9830).

Penang: Richmond Pool, Government Hill (Haniff and Kadir 15018).

Leucophanes pugioniforme Fleisch. ined.

Singapore: bei Tandjong Katong (Fleischer).

Octoblepharum albidum (L.) Hedw.

Widely distributed; common in the north of the Peninsula,
but not collected in the southern part.

Arthrocnemum Schimperii Doz. and Molk.

Selangor: Telok Reserve, Klang (Burkill 5991, 6554).

Perak: Tapah (R. 156).

Kelantan: Sungci Keteh (Nur 11991 a).

Exodictyon Blumii (Nees) Fleisch.

Perak: Tapah (R. 819).

FISSIDENTACEAE.**Fissidens ceylonensis** Doz. and Molk.

Singapore: ad fossas (Kurz 1203; *F. abbreviatus* Mitt. MS in herb.).

Fleischer also records it from Singapore without further locality.

Malacca: Ayer Kurau (R. 702).

Penang: Crag Hill (Binstead 26, 40, 45). Government Hill (R. 749). Gardens (Holtum 17372, 17375).

Fissidens Hollianus Doz. and Molk.

Perak: Tapah (R. 819 b).

Trengganu: Kuala Telumong (Holtum 15310).

Penang: in botanischen Garten an Baumaesten, c.fr. (Moeller).

Kedah: Pulau Lankawi, on rock and small stems by stream (Holtum 17438).

DISTR. Java.

Fissidens Zollingeri Mont.

Trengganu: Kuala Telumong (Holtum 15310 p.p.)

A very little, mixed with *F. Hollianus*.

Fissidens javanicus Doz. and Molk. nov. var. **integrifolius**

Dixon ined.

Trengganu: Kuala Berang (Holtum 15334).

Kedah: Pulau Lankawi (Holtum 17447).

DISTR. (of type) Java, Andamans.

Fissidens siamensis Broth.

Kedah: Pulau Lankawi (Holtum 17479).

DISTR. Siam.

Fissidens crassinervis Lac.

Singapore: Bukit Timah (Fleischer, *M. Frond. Arch. Ind.* 17); Gaylang (R. 626); Gardens (R. 603); Reservoir jungle (Holtum 15366).

Perak: Tapah (R. 148).

Penang: rocks and stones in Botanic Gardens (Binstead 17, 74); Waterfall Gardens (Holtum 17377).

Kedah: Pulau Lankawi (Holtum 17446).

Fissidens Mittenii Par.

Singapore: (Fleischer); Gardens (Holttum 10492).

Fleischer also records the var. *javensis* from the Gardens.

I have only seen the type.

Fissidens subdiscolor Dixon in *Bull. Torr. Bot. Club* 51: 228 (1924).

Negri Sembilan: on root in a boggy hollow, Gemas (Burkill 6388).

Fissidens Zippelianus Doz. and Molk.

Singapore: Singapore (Fleischer); Gardens (Holttum 15368).

Penang: im botanischen Garten auf Erde (Moeller).

Kedah: Pulau Lankawi (Holttum 17144).

Fissidens asplenioides (Sw.) Hedw.

Penang: Penara Bukit (R. 572).

This widely distributed species in the tropics and subtropical regions has not been recorded from the Asiatic continent.

Fissidens amblyotis Dixon in *Bull. Torr. Bot. Club* 51: 229 (1924).

Johore: on wet rock by stream. 700 ft., Gunong Lambak (Holttum 9456).

Fissidens nobilis Griff.

Pahang: Tahan (Ridley).

Perak: Temengoh (R. 194, 214).

Fissidens areolatus (Griff.)

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7980).

Ava, Burma, is the most southerly station hitherto.

CALYMPERACEAE.*SYRRHOPODON* Schwaegr.

Subgenus *Leucophanella*.

Syrrhopodon revolutus Doz. and Molk.

Singapore: Tanjong Ru (R. 255); Gardens (Holttum 15351).

Perak: Krian road, Taiping (Haniff 13287).

Penang: (Fleischer).

Syrrhopodon borneënsis (Hampe) Jaeg.

Johore: Gunong Belumut, 3000 ft. (Holttum 10753, 10765).

Pahang: Gunong Tahan (R. 1002); a robust form with lanuna cells smooth and back of nerve only slightly roughened.

Kedah: Kedah Peak, 3000 ft. (Holttum 14883).

Penang: Crag Hill (Binstead 24); Penang Hill (R. 748).

DISTR. Borneo, Java.

Syrrhopodon rufescens Hook. and Grev.

Singapore: Gardens (R. 780); Bukit Timah (Fleischer, *M. Frond. Arch. Ind.* 103); Singapore (Wallich; fide Mitten. *Musc. Ind. Or.*). Gardens, on *Platynerium* (Holttum 17385).

Syrrhopodon confertus Lac.

Singapore: Chan Chu Kang (R. 263). I have not seen this; it was determined by Brotherus, I believe.

Syrrhopodon Ridleyi Broth. & Dixon in *Bull. Torr. Bot. Club* 51: 229 (1924).

Singapore: Bukit Timah, on a *Platynerium* (R. 38, 731).

Penang: Government Hill, on lower side of large *Platynerium* (Burkill 763).

Subgenus *Eu-Syrrhopodon*.

Syrrhopodon albidus Thw. and Mitt.

Johore: Gunong Belamut, 3000 ft. (Holttum 10809).

DISTR. Ceylon.

Syrrhopodon tristichus Nees.

Pahang: Gunong Berumban, 5000 ft. (Henderson 11767); Fraser Hill, 4000 ft., (Holttum 11372).

New to the mainland of Asia.

Syrrhopodon albo-vaginatus Schwaegr.

Singapore: Brotherus gives the distribution of this species as including Singapore; Reservoir jungle (Holttum 15363).

Pahang: Kuala Lipis (Burkill 15667c).

Perak: Sungai Siput (Haniff and Nur 6955).

Syrrhopodon involutus Schwaegr.

Singapore: Gardens (R. 29); Singapore (Fleischer).

Malacca: Mt. Ophir (Griffith; fide Mitten).

[*Syrrhopodon pseudo-involutus* Broth. ined.

Singapore: Tanjong Katong, on coconut trees (R. 210).

This is a MS. name of Brotherus'; the species has not been described, and I have not been able to see specimens.]

Syrrhopodon spiculosus Hook. and Grev.

Singapore: (Wallich; Fleischer); Kranji (Ridley); Bukit Timah (Burkill AB); Carimon Is. (Fox 581); &c.

Penang: Crag Hill (Binstead 22), two very different forms in habit and direction of leaves when dry.

Syrrhopodon elimbatus Dixon in *Bull. Torr. Bot. Club* 51: 230 (1924).

Malacca: Mt. Ophir (Ridley).

Syrrhopodon horridulus Fleisch. *Musc. der Fl. von Buit.* 1, 208, and corrigenda.
Singapore: Singapore, 1898 (Fleischer).

Syrrhopodon Griffithii Mitt.

Singapore: "Singapore (Griffith)." So Mitten in the *Musci Ind. Orientalis*; but Ridley points out that this should probably read Malacca, as Griffith did not visit Singapore.

Fleischer, it may be remarked (*op. cit.* 1,208) speaks of the leaf as having "an der Scheide einzeln, lange, wimperartige Zaelne"; but this is in direct contradiction to the description, where the margins are distinctly stated to be "integerrimis" and without the basal spines of *S. trachyphyllus*.

Syrrhopodon ligulifolius Dixon in *Bull. Torr. Bot. Club* 51: 230 (1924).

Penang: Penara Bukit (R. 576).

Syrrhopodon trachyphyllus Mont.

Singapore: Singapore (Gaudichaud) side Mitten, *Musc. Ind. Or.*; ibidem (Fleischer).

Syrrhopodon cavifolius Lac.

Trengganu: Kuala Trengganu (Holtum 15189).
DISTR. Banca, Borneo.

Syrrhopodon ciliatus (Hook.) Schwagr.

Singapore: on sago palm, gardens (R. 459, 465); Fleischer, *M. frond. Arch. Ind.* 26. Seletar (R. 739).
Pahang: Kuantan (Burkill 16125).

The forma *pseudopodianus* Fleisch. occurs in both the above localities.

Syrrhopodon perakensis Dixon in *Bull. Torr. Bot. Club* 51; 231 (1924).

Dindings: Lumut (R. 449).

Subgenus *Thyridium*.

Syrrhopodon Wallisii C. M.

Singapore: (Fleischer).

Johore: Gunong Pulai, on fallen tree trunk (Holtum 16339).

Syrrhopodon repens Harv.

Singapore: Gardens (R. 45): Chan Chu Kang (R. 262);
Pasir Panjang (R. 55); Bukit Timah (R. 309); Bukit
Mandai (R. 706); Kranji (R. 11275).

Penang: Crag Hill (Binstead 29, 32).

It is rather curious that this species should appear to be common about Singapore, while apparently scarcely elsewhere in the Peninsula. It occurs in Ceylon and Banca.

Syrrhopodon Manii C. M.

Singapore: Tanjong Katong, f. *minor* (Fleischer, *M. Froud. Arch. Ind.* 71); Gardens (R. 315, 592); Seletar (R. 459); Pulau Ubin (R. 729); Galang (R. 357).

Penang: Craig Hill (Binstead 27 a).

Syrrhopodon fasciculatus Hook. and Grev.

Singapore: (St. V. B. Down 56); Kranji (Moeller); Gardens (Holtum 15352).

Trengganu: Kuala Trengganu, base of palm stem (Holtum 15309).

Syrrhopodon undulatus (Doz. and Molk.) Lindb.

Singapore: Reservoir jungle (Holtum 15364).

Perak: Temengoh (R. 217); Taiping (R. 204).

Kedah: Lankawi Is. (Haniff and Nur 7526); Kedah Peak, 3000 ft. (Holtum 14891).

Syrrhopodon undulatus Broth. and Geh.

Singapore: (Fleischer); on trunk of tree, Reservoir jungle (Holtum 15358).

Penang: (Schiffner).

These records and that of *S. Wallisii* are found in Fleischer, *Musci der Fl. von. Buit. I*, 236.

Syrrhopodon flavus C. M.

Singapore: Gardens (Holtum 15356, 15357).

DISTR. Java.

Syrrhopodon pungens Dixon in *Bull. Torr. Bot. Club* 51: 231 (1924).

Selangor: Pataling (R. 772).

Subgenus *Calymperopsis*.

[*Syrrhopodon semiliber* (Mitt.) Besch. Brotherus (*Musci*) records this from "Malacca" only. Mitten's record in the *Musci Ind. Or.* p. 41 ("in peninsula Malayana, ad Tavoy") refers to Burma, and does not come within our area.]

Subgenus *Calymperidium*.**Syrrhopodon Muellieri** (Doz. and Molk.) Bry. jav.

Singapore: Bajau (R. 242).

Johore: Gunong Pulai (Best 7708).

Perak: Temengoh (R. 186); Gunong Batu Puteh, 3400 ft. (Wray 1211 p. p.)

Penang: Penang Hill (R. 579).

Syrrhopodon fallax Lac.

Malacca: Mt. Ophir (R. 736).

Perak: Gunong Batu Puteh (Wray 1211 p.p.).

DISTR. Borneo; Banca.

No. 1211 Wray was received as *Syrrhopodon Wrayi* Broth. MS. It contained two species of *Syrrhopodon*, one of which is certainly a form of *S. Muelleri*, and the other *S. fallax*.

***Syrrhopodon croceus* Mitt.**

Singapore: (Wallich); (St. V. B. Down 51); Reservoir jungle (Holtum 15361, 15362).

Johore: Gunong Belumut, 3000 ft. (Holtum 10819); Gunong Panti (Holtum 15043); Gunong Pulai (Holtum 16337).

Kelantan: Sungei Ketah (Nur 11991 b).

Kedah: Kedah Peak, 1000 ft. (Holtum 15110). A beautiful form, the whole plant purple-red.

Penang: Crag Hill (Binstead 19); Richmond Pool (Haniff and Kadir 15022).

***Syrrhopodon rectifolius* Dixon ined.**

Kedah: Kedah Peak, 3500 ft. (Holtum 14861).

***Calymperes Dozyanum* Mitt. (Syn. *C. Boulayi* Besch.).**

Singapore: Gardens (Abdul Kadir 10494); ibidem, an Alleebaumen (Fleischer, *M. Froud. Arch. Ind.* 66); Kranji (R. 205).

Penang: on tree (Binstead 23).

C. eutrichostomum C. M. from Singapore is according to Fleischer only a narrow leaved form of *C. Dozyanum* Mitt.

***Calymperes Delessertii* Besch.**

Singapore: (fide Brotherus).

Pahang: Pekan, Garden of H. H. the Sultan (Burkill 17130).

Burkill notes that this is used for stuffing mattresses. It seems rather surprising that it should occur in sufficient quantity.

***Calymperes subintegrum* Broth.**

Johore: Gunong Pulai, on tree trunk in jungle (Holtum 16335).

DISTR. Siam, Borneo.

A very distinct species in the structure of the leaf cells; cf. *Journ. Linn. Soc., Bot.*, xliii, 305.

***Calymperes nitidiusculum* Broth. e Roth in *Hedwigia* li, 128 (nomen nudum).**

Johore: Gunong Pulai, on tree trunk in jungle (Holtum 16355).

DISTR. South Kanara, India.

This agrees well with an original specimen kindly sent me by Dr. Brotherus. It is extremely near to *C. subintegrum* Broth. and has the peculiar *Timmia* like cells of that species, but differs in one or two characters.

***Calymperes Vriesi* Besch.**

Penang: Ayer Itam; nov. var. **robustum** Dixon. (Binstead 20).

DISTR. (of type) Celebes.

***Calymperes stenophyllum* Dixon in *Bull. Torr. Bot. Club* 51: 233 (1924).**

Dindings: Lumut (R. 777).

***Calymperes nicobarense* Hampe.**

Singapore: Gardens (R. 355); Bajau (R. 218, 219); Pa-ir Panjang (R. 250); Woodlands (R. 12603); Kranji (R. 260); Keppel Harbour (Holttum 17480).

Kedah: Pulau Lankawi (Holttum 17417).

This is another case of a species being apparently frequent about Singapore while detected scarcely elsewhere in the peninsula. Otherwise it is known only from the Nicobar Is. It is a fairly marked species, the Singapore plants agreeing well with Hampe's type, differing from *C. Hampei* in the very rigid leaves and teriole scarcely reaching above the shoulder.

***Calymperes punctulatum* Hampe.**

Singapore: Singapore (Fleischer).

Penang: Crag Hill (Binstead 21, 38); Ayer Itam (Binstead 36); Richmond Pool, Government Hill (Haniff and Kadir 15011, 15017), a tall form.

This also occurs elsewhere only in the Nicobar Is. A specimen exists in the Brit. Museum collection labelled "II. 1250, Singapore, leg. ? Wallich," determined by Bescherelle.

***Calymperes Hampei* Doz. and Molk.**

Singapore: bei Serangoon auf Mangrove (Moeller). Gardens, on Albizzia (Holttum 15112).

Johore: Ulu Kahang, 250 ft. (Holttum 10894).

Penang: Ayer Itam (Binstead 25); rock, Botanical Gardens (Binstead 28); Ibidem (Holttum 17382).

Kedah: Pulau Lankawi (Holttum 17471).

***Calymperes Fordii* Besch.**

Penang: Ayer Itam (Binstead 33, 35).

So far as it goes this seems to agree better with *C. Fordii* than with *C. Hampei*, but the differences are very slight, and I believe inconstant, some of the characters given by Fleischer for *C. Fordii* (e.g. basal hyaline cells quadrate) are not supported by Bescherelle's type, in which, too, the outline of the cancelline is very variable.

***Calymperes tenerum* C. M.**

Singapore: Singapore (Schiffner, Fleischer).

***Calymperes Bescherellei* Fleisch. (Syn. *C. anisodictyon* Besch. in sched., fide Fleischer).**

Singapore: Bukit Timah road (Schiffner).

Calymperes serratum A. Br.

Singapore: Bukit Timah (R. 311); Singapore (St. V. B. Down, herb. Binstead); Kranji (Moeller).

Calymperes recurvifolium Besch.

Singapore: Bukit Timah (R. 598; and Fleischer, *M. Froid. Arch. Ind.* 67).

Johore: Gunong Pulai (Holtum 16336).

Penang: im bot. Garten auf erde und Wurzeln (Moeller).

Calymperes heterophyllum (Mitt.) Besch.

Penang: shaded granite rock, (rag Hill (Binstead 13a).

A stem or two picked out of *Leucoloma*. It agrees exactly with Gardner's plant at Kew.

DISTR. Ceylon; Banca.

Calymperes orientale Mitt. var. **polytrichoides** Fleisch. (*C. subfasciculatum* Broth.)

Singapore: Chan Chu Kang (R. 277).

Fleischer reduces this to a var. of *C. orientale*.

Calymperes setifolium Hampe (*C. angustatum* Broth.).

Perak: Tapah (R. 149).

This, the type of *C. angustatum* Broth. MS. in sched., is certainly identical with *C. setifolium*.

DISTR. Philippines.

Calymperes fasciculatum Doz. and Molk.

Johore: foot of Gunong Pulai, on exposed rock (Holtum 16334).

DISTR. Java.

Calymperes longifolium Mitt. (*C. cristatum* Hampe).

Singapore: Chan Chu Kang (R. 410).

Pahang: Gunong Berumban, 5500 ft. (Henderson 11743).

Penang: Penang Hill (R. 533).

Kedah: Pulau Dayang Bunting, Lankawi Is. (Holtum 15132).

C. cristatum Hampe, as I have shown elsewhere, is identical with *C. longifolium*. I am much inclined to believe that several of the species of *Macrhimanta* are but forms of a variable type, perhaps all to be included under *C. serratum*.

Calymperes constrictum Dixon in *Bull. Torr. Bot. Club* 51: 233 (1924).

Selangor: Klang watercatchment forest; on rotten bark on the ground (Burkill 6836).

***Calymperes salakense* Besch.**

Singapore: Bukit Timah (Fleischer).

Penang: Waterfall Gardens (Holttum 17381, 17384).

[*Calymperes squarrosus* Broth. MS. was founded on a plant of Ridley's, St. Paul's Hill, Malacca (333); unfortunately no material is available; the specimen in the Singapore Bot. Gardens collection consists entirely of *Barbula indica* and *Bryum coronatum*, two terrestrial species which can hardly have formed part of the same gathering as a *Calymperes*].

[*Calymperes molluccense* Schwaegr. is recorded by Mitten as having been collected by Wallich in Singapore; but so many plants have been put under that name that it is scarcely possible to decide on its identity].

POTTIACEAE.***Hymenostomum edentulum* (Mitt.) Besch.**

Kedah: Pulau Lankawi (Holttum 15099).

***Hymenostomum malayense* Fleisch., M. *der Fl. von Buit.* 1,315.**

Singapore: (Fleischer.).

***Trichostomum sarawakense* Dixon in *Journ. Linn. Soc., Bot.* xliii, 308.**

Perak: Gunong Lanoh, 350 ft., in crevices in limestone (Henderson 15063).

DISTR. Sarawak.

***Hyophila commutata* Broth.**

Singapore: c. fr. (Moeller).

***Hyophila javanica* (Nees) Brid.**

Singapore: auf dem Friedhof an Mauersteinen &c., c. fr. (Moeller).

***Hyophila Micholitzii* Broth.**

Singapore: same localities as the preceding species (Moeller).

***Chionoloma latifolium* Dixon ined.**

Kedah: Pulau Dayang Bunting, Lankawi Is., on limestone rocks (Holttum 15130).

Barbula comosa* Doz. and Molk.**Singapore: (Griffith) fide Mitten, *Musc. Ind. Or.* p. 35; but see note on *Syrrhopodon Griffithii*.Barbula indica* Brid.**

Singapore: (Fleischer); in bot. Garten, &c. (Moeller).

Penang: im bot. Garten, (Moeller); Crag Hill, &c. (Binstead, 3, 34); Penang Hill (R. 747).

***Barbula consanguinea* Thw. and Mitt.**

Singapore: (Fleischer).

Barbula lousiadum Broth.

Penang: Crag Hill (Binstead 30).

Gymnostomiella vernicosa (Hook.) Fleisch.

Singapore: an Mauern, c. fr. (Moeller).

Splachnobryum Oorschotii (Lac.) C. M.

Singapore: am Reservoir an feuchten Steinen (Fleisch.)

ORTHOTRICHACEAE.**Desmotheca apiculata** (Doz. and Molk.) Lindb.

Singapore: Bukit Timah (R. 801).

DISTR. Amboina, Borneo, Java, Sumatra, Philippines, Burma (Mergui, leg. Meebold, 16618, herb. Hort. Bot. Calcutta).

Macromitrium minutum Mitt.

Perak: Gunong Batu Puteh, 3100 ft. (L. Wray Jr. 929), as *M. pilosum* Broth. MS. I cannot however separate it from *M. minutum*, from which it only differs in the reddish colour.

DISTR. Ceylon, Java.

[*Macromitrium nepalense* (Hook. and Grev.) Schwaeagr.

Singapore: "Bukit Timah?" (R. 806). A plant with the leaves generally but not always incurved at apex, but agreeing with *M. nepalense* in other respects. The specimen is however poor, and the determination doubtful; the short, papillose basal cells distinguish it at once from *M. incurvifolium* (Hook. and Grev.). In all probability it is identical with the following species.]

Macromitrium brevirete Dixon.

Pahang: Jerantut, on upper branches of tree, about 60 ft. from the ground (Burkill 17167).

Macromitrium goniorrhynchum Doz. and Molk.

Singapore: im botanischen Garten (Moeller).

Macromitrium Zollingeri Mitt.

Kedah: Kedah Peak, 3000 ft., on dead tree trunk (Holttum 14862). This has the seta quite smooth, as in *M. Zollingeri*, but that species, *M. Blumei* and *M. concinnum* must be very close to one another.

Macromitrium ochraceum (Doz. and Molk.) C. M.

Kedah: Kedah Peak, 3800 ft., on ground, just below summit (Holttum 14871). New to the mainland of Asia.

DISTR. Java, Sumatra, Borneo.

Macromitrium Blumii Nees.

Malacca: Mt. Ophir (R. 231).

Pahang: Gunong Tahan (R. 1009).

DISTR. Java, Sumatra, Borneo.

Macromitrium magnirete Dixon in *Bull. Torr. Bot. Club* 51: 234 (1924).

Pahang: Gunong Tahan, 7000 ft. (Haniff and Nur 7907).

Macromitrium semipellucidum Doz. and Molk.

Singapore: Kranji (R. 308); Sungei Buloh (R. 244).

Negri Sembilan: Pantai (R. 749).

Selangor: Telok Reserve, Klang (Burkill 6613).

Perak: Temengok (R. 178); Kuala Kenering (R. 208).

Trengganu: Kuala Berang (Holttum 15333).

Macromitrium incurvifolium (Hook and Grev.) Schwaegr.

Singapore: Kranji (R. 261); Chua Chu Kang (R. 402).

Macromitrium sp.

Johore: Castlewood, on coffee trees, Apr. 1903 (R. 11622).

A sterile plant which appears to have some rather marked characters, but in absence of fruit and the somewhat doubtful normal habit (many branches are globose while others are several centimetres in length) it is best left undetermined.

[*Macromitrium orthostichum* Nees is recorded for Malacca by Brotherus (*Musci*, i, 479), but I do not know on what authority, and am inclined to question its authenticity. Fleischer does not cite it.]

FUNARIACEAE.

Funaria hygrometrica (L.) Sibth.

Frequent in clearings, on ashes etc. (fide H. N. Ridley). Pahang: G. Tahan (R. 1006).

DREPANOPHYLLACEAE.

Mniomalia semilimbata (Mitt.) C. M.

Penang: on granite rock, Ayer Itam (Binstead 37).

DISTR. Sumatra, Borneo, New Guinea, Samoa.

BRYACEAE.

Bryum argenteum L.

var. **australe** Rehm.

Penang: on granite rock, 2000 ft. (Binstead 39).

Bryum coronatum Schwaegr.

Common.

Bryum gedeanum Bry. jav.

Malacca: Mt. Ophir (R. 282).

Penang: Ayer Itam (Binstead 41). This is a somewhat larger plant, with more Bryoid, less Pohlioid areolation than in the Javan specimen issued by Fleischer (*M. Frond. Arch. Ind.* 365); but it agrees quite well with a small specimen in the British Museum collection "Java, Lacoste."

DISTR. Java.

Bryum ambiguum Duby.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 8004).

Penang: Crag Hill (Binstead 42).

Binstead's plant is sterile; the Pahang specimen has abundant but immature fruit; the determination is therefore not quite certain, but I have little doubt that it is correct.

DISTR. Java, Sumatra, Philippines, Tonkin.

Bryum nitens Hook.

Johore: Ratoe (Moeller).

Bryum porphyroneuron C. M.

Penang: Penang Hill (R. 751).

Rhodobryum giganteum (Hook.) Schimp.

Pahang: Telom (R. 129); *ibidem*, 4000 ft. (Wray 1613).

MNIACEAE.

Mnium integrum Bry. jav.

Pahang: Fraser Hill, in shade near stream, circa 3900 ft. (Holtum 11479).

Perak: (Ridley, in herb. D. Lillie, as *M. succulentum* Mitt.).

This is certainly the plant of the *Bry. jav.*, and the plant described by Fleischer (*M. der Fl. von Buitenzorg* II, 581), but it is not identical—as Fleischer makes it—with *M. succulentum* Mitt., which is a quite different plant with much larger cells.

It appears to me doubtful whether *M. integrum* be anything more than a diocious form of *M. rostratum*.

DISTR. Java, Sumatra.

RHIZOGONIACEAE.

Rhizogonium spiniforme (L.) Br.

Common.

Rhizogonium latifolium Bry. jav.

Singapore: Kranji (R. 106); Chan Chu Kang (R. 413).

Johore: Gunong Belumut, 3000 ft. (Holtum 10697).

Pahang: Gunong Tahan: (Ridley, without number).

Penang: Penang Hill (R. 526); Richmond Pool, Government Hill (Haniff and Kadir 15003).

Rhizogonium novae-hollandiae Brid.

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur. 7976). Sterile.

DISTR. South Australia, Patagonia.

A remarkable extension of the range of this species. The Pahang plant is a slightly more rigid form than the Australasian, with the leaves not at all altered when dry, but in all other respects agrees exactly. *R. salakanum* Broth. differs at once in the nerve not excurrent.

BARTRAMIACEAE.

Philonotis laxissima (C. M.) Bry. jav.

Penang: Craig Hill, 2000 ft. (Binstead 41); Penang (Haniff 300); im botanischen Garten (Moeller).

Philonotis secunda Doz. and Molk.

Perak: Maxwell's Hill (Burkill 12779, 12814); Taiping Hills (R. 11641).

WEBERACEAE.

Diphyscium rupestre Doz. and Molk.

Singapore; rare, on a rock, Bukit Timah (R. 618).

Perak: Gunung Keledang (R. 702).

DISTR. Java, Borneo.

POLYTRICHACEAE.

Rhacelopus pilifer Bry. jav.

Negri Sembilan: Gunung Tampin, on exposed rocks and earth, 900-1800 ft. (Burkill 2861, 2865).

Selangor: Ginting Peras (R. 420); Weld Hill Reserve, Kuala Lumpur (Nur 4766); Semangkok (Ridley).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8772).

Perak: Lenggong (R. 175); Taiping (R. 198); Maxwell's Hill (R. 281; Burkill 13216); Bujong Malacca (R. 743); Tapah (R. 169).

Kelantan: Kuala Kerai (Haniff and Nur 10145).

Pogonatum Neesii C. M.

Pahang: very abundant on freshly cleared ground on hill top, Fraser Hill (Burkill and Holttum 8458).

Fleischer, *M. der Fl. von Buit.* IV, 1583, 1590, describes the capsule as smooth; but C. Mueller in the original description describes it as "sexies carlosa," and the ribbed capsule, plicate when empty, is distinct in the Neilgherries plant. It may, I think, be doubted whether *P. Junghuhnianum* really differs.

Pogonatum Junghuhnianum (Doz. and Molk.) var. ***incurvum*** Bry. jav.

Pahang: Telom (R. 103).

Pogonatum cirratum (Sw.) Brid.

Negri Sembilan: Gunung Angsi, abundant above 2000 ft. (Holttum 9933).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8469).

Perak: Batang Padang (Stresemann, 79); Maxwell's Hill, 3600 ft. (Burkill 12910).

Penang: Western Hill (Burkill 765); Moniot's Rd. (Burkill 2586).

Pogonatum Teysmannianum (Doz. and Molk.) Bry. jav.; forma foliis longioribus, siccitate valde contortis.

Penang: Richmond Pool, Government Hill (Haniff and Kadir 15021).

Kedah: Kedah Peak, 3000 ft. (Polittum 15025).

DISTR. Java, Sumatra, Borneo, Amboina: (of type).

Pogonatum macrophyllum (Doz. and Molk.) Bry. jav.
(Syn. *P. flexicaule* Mitt.)

This magnificent species, which may attain a height of 35 cm., is not infrequent. I have records from Malacca, Selangor, Pahang, Perak, and Penang.

Elaborate attempts have been made to maintain the distinction between the Javan *P. macrophyllum* and the continental *P. flexicaule* Mitt., based entirely on the presence of lamellae of one row of cells in the latter, while in *P. macrophyllum* they are supposed to be absent, or the leaves are described as "fast lamellenlos." There is no reason I believe to suppose that the latter form is confined to Java, or that the continental plant is always the lamellate form; Fleischer indeed (who does not refer to *P. flexicaule*) records *P. macrophyllum* from Perak.

In my opinion they are but slight forms of the same plant, the Javan form exhibiting a slightly more hygrophytic condition. This view is I think not only supported but demonstrated by the fact that in cutting sections of *P. macrophyllum* (Fleisch., M. Fr. Arch. Ind. et Polyn. 499) I have found leaves which show the lamellae as fully developed as those of typical *P. flexicaule*.

Pogonatum sp.

Perak: Maxwell's Hill (Curtis 847).

A curious plant with habit of *P. contortum* (Menz.), but the capsule is quite different. The lamellae are very low, probably 1-seriate, but the leaves are strongly curled and very fragile, and do not moisten out, so that it is impossible to get a satisfactory section; and it is difficult to know whether it is a normal or a pathological condition. It is probable that it is a new species.

MYURIACEAE.

Myurium rufescens (Hornsch. and Reinw.) Fleisch.

Singapore: Gardens (R. 50).

Myurium subnitens Dixon in *Bull. Torr. Bot. Club* 51: 234 (1924).

Pahang: Fraser Hill (R. 282).

NECKERACEAE.

Endotrichella elegans (Doz. and Molk.) Fleisch.

Pahang: Fraser Hill, 1000-1370 ft. (Burkill and Holtum 8821); Robinson's Falls, Cameron's Highlands, 4800 ft. (Henderson 11727); Gunong Berumban, 6000 ft. (Henderson 11750); Telom (R. 113).

Perak: Gunong Kerbau (Haniff 243); Batang Padang (Stresemann 96).

Endotrichella plano-marginata Dixon in *Bull. Torr. Bot. Club* 51: 235 (1924).

Selangor: Gua Batu (R. 472).

Garovaglia aristata Bry. jav.

Selangor: Gua Batu (R. 640); Kuala Lumpur (R. 259).

DISTR. Burma.

Garovaglia polythrix Dixon ined.

Penang: Government Hill, 2500 ft. (Holtum 17374).

Symphysodon neckeroides Doz. and Molk.

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7109).

DISTR. Java, Sumatra, Borneo.

Papillaria fuscescens (Hook.) Jaeg. var. **rigidicaulis** Fleisch.

Pahang: Gunong Tahan (R. 1017).

Kedah: Kedah Peak, 3000 ft. (Holtum 14886). A form with shortly pointed, very plicate leaves.

Meteorium Miquelianum (C. M.) Fleisch.

Pahang: Gunong Berumban (R. 118).

Selangor: Batu Caves (R. 843).

Floribundaria floribunda (Doz. and Molk.) Fleisch.

Selangor: Gua Batu (R. 495).

Perak: Temengoh (R. 225, 230).

Penang: Crag Hill (Binstead 46).

Aerobryopsis longissima (Doz. and Molk.) Fleisch.

Frequent, and very variable.

var. **condensatum** Dixon.

Penang: Crag Hill, on gritty soil on ground (Binstead 64).

A very dense and very small form, with short branches and very small leaves.

Orthorrhynchium philippense (C. M.)

Perlis: Kanga (R. 305).

DISTR. Philippines.

Neckeropsis gracilentia (Bry. jav.) Fleisch.

Singapore: Chua Chu Kang (R. 357).

Selangor: Gua Batu (R. 479).

Dindings: Gunong Tungul (R. 502); Bruas (R. 500).

Neckeropsis lepineana (Mont.) Fleisch.

Perak: Gunung Kerbau (Haniff 844).

Penang: (Curtis 4).

Neckeropsis penicillata Herzog in *Hedwigia* lvii, 242 (1916).

In der Bergen des Sakai-Gebietes (Inner-Malakka) von Dr.

E. Werner gesammelt.

Neckeropsis andamana (C. M.) Fleisch.

Kedah: Pulau Dayang Bunting, Lankawi Is. (Holtum 15131). The determination is not quite certain. The leaves are a little more pointed than usual.

Himantocladium plumula (Nees) Fleisch.

Malacca: Bukit Tampin (Goodenough 1950).

Selangor: Ginting Bidai (R. 412).

Trengganu: (R. 280).

Penang: fide Fleischer (*Musci der Flora von Buit.* iii, 892) as *H. arbuscula* (Hampe). I have no hesitation however in following Mitten in reducing *H. arbuscula* to *H. plumula*.**Himantocladium rugulosum** (Mitt.) Fleisch.

Penang: (R. 559); im botanisch. Garten (Moeller).

Himantocladium loriforme (Bry. jav.) Fleisch.

Johore: Pulau Tinggi, on rocks by stream (Burkill 941).

Himantocladium exsertum (Hook.) Fleisch.

Malacca: fide Fleischer (op. cit. p. 887).

Homaliodendron flabellatum (Dicks.) Fleisch.

Malacca: fide Fleischer.

Kedah: Lankawi Is. (Haniff and Nur 7116).

Homaliodendron javanicum (C. M.) Fleisch.

Pahang: Gunung Berumbau, Cameron's Highlands, 5000 ft. (Henderson 11769).

Homaliodendron microdendron (Mont.) Fleisch.Malacca: (R. 722). This is recorded in Ridley's list as *H. flabellatum*, but I have no doubt it is a lapsus calami of Brotherus for *H. microdendron*; my specimen is clearly that and there is no apparent mixture.**Homaliodendron scalpellifolium** (Bry. Jav.) Fleisch.

Perak: Gunung Hijau, on trees (Wray 107).

Homaliodendron pinnatelloides Herzog in *Hedwig.* lxi, 296 (1919).

Perak: Batang Padang: (Stresemann 91).

Homaliodendron intermedium Herzog op. et loc. cit.

Perak: Batang Padang: (Stresemann 84)

Homaliodendron exiguum (Bry. jav.) Fleisch.

Perak: Batang Padang (Stresemann 88).

Homaliodendron glossophyllum (Mitt.) Fleisch.

Perak: Taiping (R.); Temengoh (R.).

Pinnatella anacamptolepis (C. M.) Broth.Selangor: Gua Batu (R. 638); Mitten determined this as *P. mucronata*, but it is certainly this species.

Perak: Tapah (R. 166).

Pinnatella mucronata (Bry. jav.) Fleisch.

Singapore: (Geach 39, herb. Mitt.); Stagnmount (R. 140).

Johore: Kota Tinggi (Holtum 15046).

Pahang: Gunong Tahan: (R. 824).

Perak: Tapah: (R. 116) as *P. complanata* Broth. MS., but I can find no difference from *P. mucronata*.**Pinnatella Kuehliana** (Bry. jav.) Fleisch.

Singapore: (Herb. Mitten).

Selangor: Gua Batu (R. 639).

Pahang: River Tahan (R. 211).

Pinnatella microptera (C. M.) Fleisch.

Singapore: Palms at Tanjong Katong (Fleischer).

Perak: Kati, Kuala Kangsar (Haniff 11937).

Pinnatella lingulata Dixon in *Bull. Torr. Bot. Club*, 51: 236 (1921).

Negri Sembilan: Gunong Tampin, 1800 ft., horizontal on upright trunks (Burkill 2864).

Perak: Gunong Batu Puteh 3100 ft. (L. Wray Jr. 1042). This was received as *Neckera plumuloides* Broth. M.S., but it had already been published under the present name.

ENTODONTACEAE.

Entodon Bandongiae (C. M.) Jaeg.

Selangor: Rawang (R. 103).

Pahang: Telom (R. 89).

Perak: Batang Padang Valley (L. Wray Jr. 1465). As *Entodon subpallidisetus* Broth. M.S. I cannot however separate it from this.**Campylodontium flavescens** (Hook.) Bry. jav.

Pahang: Telom (R. 109).

Penang: (Curtis).

Cribrodontium Werner Herz. nov. gen. et sp. in *Hedwig*, ivii, 242 (1916).

Malacca: In dem Bergland der Sakai (Inner-Malakka) (Werner).

NEMATOCACEAE.

Ephemeropsis tjibodensis Goeb.

Penang: Penang Hill (R. 782).

Ridley lists this as determined, seemingly, by Brotherus. I have not seen Malayan specimens; it has hitherto been recorded only from Java, but I have recently detected it among other mosses on twigs of a Melastomaceous plant from Toko Rattan, Bencoolen, Sumatra, coll. C. J. Brooks, in herb Kew. It grows in very damp situations, and has quite probably been overlooked, owing to its minuteness and brown colour.

HOOKERIAACEAE.

Distichophyllum nigricaulis Mitt.

Pahang: Fraser Hill, 4000 ft., on log in jungle (Holttum 11376a).

DISTR. Java.

Distichophyllum sinuosulum Dixon.

Perak: Birch's Hill, 3800 ft., on rock (Burkill 12606).

Distichophyllum cuspidatum Doz. and Molk.

Penang: Penara Bukit (R. 571); Penang Hill (R. 770);
Moniot's Rd., 2300 ft., on branches near the ground
(Burkill 2584).

Distichophyllum undulatum Doz. and Molk.

Perak: Gunong Batu Puteh (Wray 945). The locality is not actually stated, but the collecting number defines it without doubt.

Distichophyllum Mittenii Bry. jav.

Johore: Kukuh (R. 4).

Pahang: Fraser Hill, on fallen tree trunk, 1000 ft. (Burkill and Holttum 8708, 8712); Gunong Bernamban, Cameron's Highlands, 6000 ft. (Henderson 11729, 11752).

Perak: Temengoh (R. 187); Sungei Mengkoro, Taiping Hills (Anderson 313).

Kelantan: Gunong Sitong (Nur 12250); a form with obtuse leaves, without apiculus, and the border almost failing above, as in *D. Osterwaldii*, but it appears to belong here.

Distichophyllum spathulatum Doz. and Molk.

Pahang: Telom (R. 104, 135); Cameron's Highlands, 5000 ft. (Henderson 11752b); circa 6000 ft. (Henderson 11779).

Perak: Gunong Batu Puteh, 3400 ft. (Wray 1039).

Distichophyllum pterygophylloides Dixon ined.

Pahang: Gunong Tahan (R. 1024).

DISTR. Java, Sumatra.

***Distichophyllum Schmidtii* Broth.**

Kedah: Pulau Lankawi, on earth bank by stream (Holttum 17115).

DISTR. Siam.

***Eriopus remotifolius* (C. M.)**

Pahang: Cameron's Highlands circa 1500 ft., on roots of an epiphytic orchid, Sept. 1925 (Kinder). Two small scraps of what is clearly this species, and represents almost the same undeveloped state as the plant described as *Cyathophorum limbalulum* Ren. and Card. Fleischer (*Musci der Flora von Buit.* III, 1011) expresses the opinion that this is probably a state of *E. remotifolius*, and the present plant confirms that view, as with exactly the same size and habit it has a broader border and longer points.

DISTR. Sumatra, Borneo, New Guinea.

***Callicostella prabaktiana* (C. M.)**

Singapore: Bukit Panjang (R. 1); Bukit Timah (R. 360, 621); Gardens (R. 620).

Negri Sembilan: Genuas, on root in boggy hollow (Burkill 6388 p.p.); Perhentian Tinggi (R. 754).

Penang: Penang Hill (R. 513).

***Callicostella papillata* (Mont.) Jaeg.**

Singapore: Bukit Timah (R. 36).

Pahang: Fraser Hill, 4000 ft. (Nur 11069, 11376).

Perak: Temengoh (R. 210); Birch's Hill, 3800 ft., on stones (Burkill 12601); Batang-Padang, forma (Stresemann 100).

Penang: Moniot's Rd., 2300 ft. (Burkill 2670), on upper surface of a plank bridge.

***Callicostella Beccariana* (Hampe) Jaeg.**

Singapore: Bukit Timah (Ridley).

Selangor: Telok Reserve, Klang, on fallen log (Burkill 6566).

***Chaetomitrium papillifolium* Bry. jav.**

Selangor: Ulu Gombak Reserve (Burkill 9964);

Perak: Tapah, on trunk of tree by river (Burkill 13513).

DISTR. Java, Ceylon, Andaman Is.

***Chaetomitrium leptopoma* (Schwaegr.) Doz. and Molk.**

Selangor: Bukit Hitam (R. 417).

Perak: Birch's Hill, 4200 ft. (Burkill 13025).

***Chaetomitrium muricatum* Bry. jav.**

Selangor: Ginting Bidai (R. 405, 411).

DISTR. Java.

C. leptopoma, *C. muricatum*, and *C. orthorrhynchum* are, as pointed out by Fleischer, three very closely related species, and perhaps more correctly considered as together forming a single species. Ridley's 405 and 411 are indeed intermediate between *C. leptopoma* and *C. muricatum*; and 405 is exactly the same thing as *C. cygneum* C. M. from New Guinea.

Chaetomitrium orthorrhynchum (Doz. and Molk.) Bry. jav.

Selangor: Gua Batu (R. 474).

DISTR. Java, Sumatra, Borneo, Celebes.

Chaetomitrium elongatum Doz. and Molk.

Pahang: Sungai Perting, Bentong (Burkill 16569).

Dindings: (R. 373).

This specimen, from the New York Bot. Garden, was named by Mitten *C. ciliatum* Doz. and Molk., but it is certainly not that species. It agrees well with Bornean specimens of *C. elongatum*, the calyptra and rather long seta being characteristic.

DISTR. Java, Borneo, Moluccas.

Chaetomitrium borneense Mitt.

Selangor:: Ginting Bidai (R. 422).

Perak: Upper Perak, 300 ft., on trees (L. Wray Jr., 3636);
as *Pilotrichella perakensis* Broth. MS.

DISTR. Borneo.

Chaetomitrium perakense Broth. & Dixon in *Bull. Torr. Bot.*

Club 51: 237 (1924).

Perak: Bidor, Tapah (R. 159, 161).

Chaetomitrium setosum Broth. *op. et loc. cit.*

Perak: Tapah (R. 169).

Chaetomitrium nematosum Broth. (*Chaetomitrium serratum*

Broth. n. sp. in sched.)

Perak: Kuala Kenering (R. 205).

Distr. Queensland.

This was actually written *Chaetobryum serratum*, but clearly by a lapsus calami. It is quite distinct from any of the Malayan species of *Chaetomitrium*, but is identical with the Queensland species, of which it has the peculiar brood-filaments, the rather curious dichroic colouring etc. The leaves are slightly less spreading than in the Queensland plant.

HYPOPTERYGIACEAE.

Hypopterygium javanicum (Hampe) Jaeg.

Singapore: Bukit Timah (Ridley).

Negri Sembilan: Tampin (Goodenough 300).

Pahang: Telom (R. 127).

RHACOPILACEAE.

Rhacopilum spectabile Reinw. and Hornsch.

Pahang: Telom (R. 92, 93, 106, 122, 124, 133, 138, 328);
Fraser Hill, 4000 ft. (Nur 11206).

Perak: Batang Padang (Stressmann 97); Jor (Haniff
11220a).

Rhacopilum cuspidigerum Schwaegr.

Pahang: Jerantut, on branch of tree circa 60 ft. above ground
(Burkill 17466). A moss with a wide insular Malayan
and Pacific distribution, but not hitherto recorded from
continental Asia.

Pelekium velatum Mitt.

Singapore: Gardens, on coral in rockeries. (Holttum 15353).

Johore: Bukit Soga (R. 240).

Selangor: Gua Batu (R. 60, 61, 62.); Telok Forest Reserve.
Klang (Burkill 7021, 7022, 6561).

Negri Sembilan: Gunung Tampin, 1800 ft. (Burkill 2853).

Pahang: Telom (R. 111); Pekan, on coral (Burkill 17132).

Perak: Temengoh (R. 188, 189, 215, 220).

Thuidium Meyenianum (Hampe) Bry. jav. (*T. trachypodium*
(Mitt.) Lac.).

Johore: Tempayan R., Kukub (Ridley).

Selangor: Ginting Bidai (R. 421).

Pahang: Telom (R. 100, 101).

Kedah: Pulau Lankawi (Holttum 17405).

Perlis: Kanga (R. 236).

Fleischer (*M. der Flora von Buil.* iv, 1521) reduces *T. trachypodium* (Mitt.) and *T. faulense* (Reichh.) to *T. Meyenianum* (Hampe). In *Journ. of Bot.* 1913, p. 326, I had already pointed out the identity of *T. faulense* and *T. Meyenianum*. At the time I was inclined to consider the Pacific *T. erosulum* Mitt. distinct from *T. Meyenianum*, on account of the laxer, more complanate, more obtuse ramuline leaves of the former. I have later come to the conclusion, however, that *T. erosulum* is certainly inseparable from *T. trachypodium*, and the view is no doubt correct that all these plants belong to one species, showing a slight variation in the leaf arrangement and the form of the ramuline leaves. If this view is maintained, *T. erosulum* Mitt. must be added to the synonymy given by Fleischer.

T. Meyenianum is easily confused with *Pelekium velatum*, indeed, unless with fruit, or at least perichaetia, is difficult to separate from it.

Thuidium bifarium (Doz. and Molk.) Bry. jav.

Singapore: Chan Chu Kang (R. 278).

Selangor: Gua Batu (R. 63, 470, 635).

Perak: Temengoh (R. 183).

Perlis: Kanga (R. 304).

Thuidium plumulosum (Doz. and Molk.) Bry. jav.

Selangor: Ulu Gombak (Ridley); Bukit Kutu (R. 113);
Genting Peras (R. 410);
Pahang: Kota Glanggi (R. 212).

Thuidium glaucinoides Broth.

Selangor: Ulu Gombak (Ridley).
Penang: Crag Hill (Binstead 72).

Thuidium orientale Mitt.

Penang: Penang Hill (Curtis, in herb. Mitten, type); Penara
Bukit (R. 567).

Thuidium cymbifolium (Doz. and Molk.) Bry. jav.

Pahang: Telom (R. 114).
Perak: Temengoh (R. 179); Ulu Batang Padang (R. 95).

HYPNACEAE.

Ctenidium falcatifolium Dixon in *Bull. Torr. Bot. Club* 51: 238 (1924).

Perak: Taiping Hills (R. 817).

ECTROPOTHECIUM. This large and very difficult genus is rather well represented in the peninsula. I believe the following determinations to be correct, but I feel myself at a disadvantage from want of knowledge of the plants in the field. Fleischer's treatment in the *Flora von Buitenzorg* is in many ways helpful; but there are certain points which I find difficult to grasp, and certain relationships made which are not easy to follow.

Ectropothecium buitenzorgii (Bélg.) Jacq.

Common and well distributed.

"*Cupressina malaccana* C. Muell. sp. n., type, Government Hill, Pulau Penang," (Curtis in sched., appears to me to be only a robust, closely pinnate form of *E. buitenzorgii*. I am also unable to see anything else in *E. falcatulum* Broth. MS. (Perak, L. Wray Jr. 957).

Ectropothecium singaporense Dixon in *Bull. Torr. Bot. Club* 51: 239 (1924).

Singapore: Gardens, in grass in open (Binstead 78).

Ectropothecium sparsipilum (Bry. jav.) Jacq.

Pahang: Gunong Berumban, Cameron's Highlands, 5500 ft., on tree trunk (Henderson 11746).

DISTR. Java.

This appears to be a critical and much misunderstood plant, and rare; the Pahang plant agrees well with the description given by Fleischer, having the habit, the seta about 2 cm. long, the calyptra slightly hairy, the perichaetial leaves strongly toothed and occasionally lacerate.

Ectropothecium ichnotocladum (C. M.) Jaeg.

Johore: Gunong Belumut, 3000 ft. (Holttum 10851).

Pahang: Telom (R. 112).

Fleischer, following the *Bry. jav.*, describes this as "fast glanzlos"; his no. 312, *M. Fr. Arch. Ind.*, is however markedly glossy, and fertile specimens from Sumatra agreeing in every way with the *Bry. jav.* figures and description are very highly so. It appears to be one of the rare cases in which the younger leaves show a gloss which is not retained in the older ones.

Ectropothecium eleganti-pinnatum (C. M.) Jaeg. (*E. callichroides* (C. M.) Jaeg. var. *elongatum* Dixon in *Bull. Torr. Bot. Club* 51: 239).

Selangor: Rawang (R. 382).

Perak: Temengoh (R. 184).

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7131);

Kedah Peak, 3000 ft., (Holttum 14898).

DISTR. Philippines.

Ectropothecium Moritzii (C. M.) Jaeg.

This species, which is stated by Fleischer to be rare in Java, is common and widely distributed in the Peninsula. I have received it from numerous localities ranging from Penang and Kelantan to Singapore.

var. **stereodontoides** Dixon in *Bull. Torr. Bot. Club* 51: 241 (1924).Pahang: Fraser Hill, 4000 ft. (Burkill and Holttum 8715d);
ibidem (Holttum 11875).

For notes on this species see my article cited above.

Ectropothecium serratum Herzog in *Hedwig*. lxi, 297 (1919).

Perak: Batang-Padang (Stresemann 80).

Herzog compares this with *E. Moritzii*, stating that it differs in the sharply serrulate leaves and the habit; but in view of the great variability in that species, in which the leaves are commonly sharply toothed, the specific value of the present plant seems to me very doubtful.

Ectropothecium dealbatum (Hornsch. and Reinw.) Jaeg.Negri Sembilan: Gunong Tampin, 1800 ft., on fallen log
(Burkill 1175).

Pahang: Raub; iron water-pipes in forest (Burkill 17155b).

Perak: Maxwell's Hill, 3800 ft. (Burkill 13198).

Penang: Waterfall Gardens (Holttum 17380).

Ectropothecium incubans (Hornsch. and Reinw.) Jaeg.Singapore: Chan Chu Kang (R. 271, as *E. malaccense* Broth.
sp. nov. in sched.). This appears to me undoubtedly *E.*
incubans.

Negri Sembilan: Perhentian Tinggi (R. 737).

Perak: Telom (R. 112, as *E. malaccense* Broth. sp. nov. in sched.)

f. *scabrula* Fleisch. (*E. scaberulum* Broth.) Selangor: Gua Batu (R. 494).

Ectropothecium penangense Fleisch. *M. der Flora von Buit.* iv, 1410.

Penang: im botanischen Garten an Palmen (Fleischer).

Ectropothecium monumentorum (Duby) Jaeg.

Singapore: Gardens (R. 319, 329, 613); Bukit Timah (R. 307).

Ectropothecium Chamissonis (Hornsch.) Jaeg.

Pahang: Fraser Hill, circa 4000 ft., on tree in jungle (Holtum 11366a).

Ectropothecium Zollingeri (C. M.) Jaeg.

Singapore: Gardens; in the tank in Plant House; fruiting only when left dry (Burkill 3258). This is no doubt a form of *E. Zollingeri*, which is a distinctly hygrophytic species.

[*Ectropothecium singapurianum* Broth. MS. is a *Vesicularia*, which I do not think can be separated from *V. reticulata*.]

Trachythecium calcicolum Fleisch. *M. der Flora von Buit.* iv, 1417.

Selangor: "Malacca; bei Gualalumpur in Kalksteinhoehlen, 200m. (detex. Fleisch. 1909)."

Allied to *Ectropothecium verrucosum* (Hampe) Jaeg., a species which should occur in Malaya.

Stereodon malayanus Dixon.

Perak: Birch's Hill, 3800 ft., on stump (Burkill 12602a).

The only species of this large and widely spread genus known from the peninsula.

Isopterygium Textori (Bry. jav.) Mitt.

Perak: Maxwell's Hill, 3800 ft., on stone in shade (Burkill 12647a).

DISTR. Japan, Annam, Borneo, South India.

Isopterygium arquifolium (Bry. jav.) Jaeg.

Kedah: Gunong Bintang, June 1917 (C. B. Kloss); in herb. Kew.

DISTR. Java, Amboina, Sumatra, Ceylon.

Isopterygium minutiramem (C. M.) Jaeg.

Singapore: Garden jungle (R. 328, 366).

Johore: Kukub (R. 301).

Pahang: Kuantan (Burkill 16126, 16703).

Perak: Birch's Hill, 3800 ft. (Burkill 12604).

***Isopterygium albescens* (Schwaegr.) Jaeg.**

Singapore: Gardens, on Palm stem (Binstead 77).

Selangor: Gua Batu (R. 58, 106, 637). These appear as *Betropothecium leuophyllum* Mitten MS. in Mitten's herbarium.

Pahang: Fraser Hill, 1000-1370 ft. (Burkill and Holttum 9181).

Perak: Maxwell's Hill, 3800 ft, on stone in shade (Burkill 12647b).

***Isopterygium subalbescens* Broth.**

Singapore: (Fleischer).

***Isopterygium laxissimum* Card.**

Selangor: Gua Batu (R. 641).

DISTR. Formosa.

This agrees perfectly with Cardot's description of the Formosan plant.

***Isopterygium bancanum* (Bry. Jav.) Jaeg.**

Selangor: Gua Batu, on the ground (Burkill 6371); ibidem (R. 645).

Penang: Crag Hill (Binstead 55).

***Isopterygium constrictum* Broth. ined.**

Perak: Lower Camp, Gunong Batu Puteh, 3400 ft. (L. Wray Jr. 1403).

***Plagiothecium Miquelii* (Bry. jav.) Broth.**

Common and widely distributed; somewhat variable in habit, size, gloss, &c., but retaining its structural characters very constantly. Fleischer places it in *Vesicularia*, and it is certainly closely allied to *V. Kurzii*. It occurs under various names in herbaria; e.g. *Taxithelium albifolium* Mitt. MS., *Taxithelium Ridleyi* Broth. MS.

TAXITHELIUM. A very complex and difficult genus, grading in different directions into *Isopterygium*, *Trichosteleum*, *Acanthocladium*, and even to other genera. The genus, as understood by Brotherus, is distributed by Fleischer among a number of new genera, some of which, at least, I think will certainly stand. I have however, adopted Brotherus's arrangement here.

***Taxithelium instratum* (Brid.) Broth.**

Singapore: Bot. Garden (Fleischer; Moeller); Jurong Road (Burkill 1410).

Negri Sembilan: Gunong Tampin (Holttum 9590).

Pahang: Jerantut (Burkill 17469).

Perak: Jor (Haniff 14249). Upper Perak, 300 ft. (L. Wray Jr. 3732), as *Trichosteleum pseudoinstratum* Broth.

Kelantan: Kuala Rek (Haniff and Nur 10178).

There is a peculiarity of the papillae in this species, which appears to have passed unnoticed. They are most frequently either bi-tri-fid at apex, or very often are geminate and side by side from the base, so that with a comparatively low magnifying power they appear often to be transversely elongate; and this is sometimes so regular that the whole line of papillae on a cell surface is "two deep," not as usual in "indian file." I have found this constant in plants from all parts including *Sigmatella trichochuete* C. M. from the Andamans, and its presence in Wray's *Trichosteleum pseudo-instratum* Broth. stamps it at once as belonging here.

Taxithelium nepalense (Harv.) Jaeg.

Singapore: Im botanisch. Garten (Moeller); Kranji (R. 695); Bukit Timah (R. 692, 693).

Pahang: 8 miles south of Kuala Lipis on sandstone rocks (Burkill 17200); Raub, on iron waterpipes (Burkill 17155a).

Penang: rocks, rotting wood, &c. (Binstead 49, 54, 61); ibidem (Fleischer).

Fleischer now unites *T. turgidellum* (C. M.) with *T. nepalense*, a reduction with which I am quite in agreement, as I have never been able to grasp the distinguishing characters. He also gives as a synonym *Trichosteleum trochalophyllum* (Hampe) Jaeg., (nomen solum) which I published (as *Tax. trachaelophyllum*) in *Bull. Torr. Bot. Club* 51: 243 (1924). Looking upon *T. nepalense* as a wide-spread species in the Indo-Malayan region, with a considerable range of variation in the form of leaf, the degree of obtuseness of the apex, and the distinctness of the papillae, this is I think quite a sound view, and at the same time my *T. subtrachaelophyllum* (op. cit.) and also *T. Gottscheanum* (Hampe) Broth. must fall into the same synonymy.

Taxithelium capillipes (Bry. jav.) Broth.

Singapore: Pulau Serapu (R. 733); Bukit Timah (R. 318). Selangor: Port Swettenham (Burkill 845, 1276, 2698).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8454).

Penang: Moniot's Rd., 2000 ft. (Burkill 2679).

Taxithelium isocladum (Bry. jav.) Ren. and Card.

Frequent. I have it from practically all the States. *T. singaporense* Broth. MS. is certainly this.

Taxithelium isocladioides Dixon in *Bull. Torr. Bot. Club* 51: 243 (1924).

Perak: Bujong Malacca (R. 737).

Taxithelium Deningeri Herz. in *Hedwig*. lxi, 298 (1919).

Perak: Batang Padang (Stresemann 89).

Apparently much like my *T. isocladioides*, but differing at once from its allies in the large, hyaline or orange cells.

Taxithelium kerianum (Broth.) Broth.

Negri Sembilan: Perhentian Tinggi (R. 738, 740).

Selangor: Klang: (Fox 833).

Perak: Temok, Tapah (R. 164). This was determined by Brotherus as *T. perakense* n.sp., but it certainly belongs here.

DISTR. Queensland, New Guinea, Java.

Taxithelium Lindbergii (Bry. jav.) Ren. and Card.

Malacca: Mt. Ophir (R. 707 p.p.).

Selangor: Semangkok, 1500 ft. (R. 482).

Penang: Penang Hill (R. 517).

Kedah: Kedah Peak (R. 245).

Widely distributed in the Malayan Islands, and known also from Tahiti, but only recorded from Annam in continental Asia.

Taxithelium papillatum (Harv.) Broth.

Common and well distributed. Very variable in form and acumination of leaf, &c. I cannot think *T. acanthocladoides* Broth. MS. any more than a form of this. *T. stigmosum* (Mitt.) is I think undoubtedly the same. Two of the extreme forms I incline to separate as varieties, var. *angustum* Dixon and var. *brevifolium* Dixon (both ined.).

Taxithelium decrescens (Doz. and Molke.) Broth.

Malacca: Kuala Lumpur, near Gua Batu (Fleischer). (This should be credited to Selangor; Fleischer uses "Malacca" evidently as a general term for the district).

Taxithelium Plumularia (C. M.) Broth.

Singapore: Bukit Timah (R. 317).

Negri Sembilan: Gemas, forming horizontal lines on a trunk (Burkill 4484).

DISTR. Only known hitherto from a single unlocalized spot in Java, coll. Blume.

Taxithelium magnum Fleisch. var. **majus** Fleisch.

Pahang: Gunung Benom, 5000 ft. (Collector 17481).

DISTR. Java, Sumatra.

A very fine and distinct species.

Taxithelium bilobatum Dixon in *Bull. Torr. Bot. Club* 51: 244 (1924).

Perak: Bujong Malacca (R. 739); Birch's Hill, 3800 ft., on stone in forest (Burkill 13007), nov. var. *scabrifolium* Dixon.

This remarkable plant, unique among mosses in having its leaves bifid or bi-lobed, was described from Ridley's No. 739, which has the leaves quite smooth. Most remarkably, within a few weeks of its publication I received the Birch's Hill specimen, which while

agreeing with the type in every other way has the apices of the cells highly prominent, so that the leaves are strongly scabrous at back. The upper marginal denticulations here, as in the type, are frequently bigeminate, a character which was overlooked in the diagnosis of the species.

Vesicularia reticulata (Doz. and Molk.) Broth.

Singapore: Bukit Panjang (R. 268); Singapore (Binstead 79); Bukit Timah (R. 630). Gardens (R. 586).

Selangor: Gua Batu (R. 493).

Perak: Maxwell's Hill (Burkill 13186).

Penang: (R. 562b).

Perlis: Kanga (R. 814).

Vesicularia Montagnei (Bel.) Broth.

Singapore: Gardens (Moeller).

Selangor: Gua Batu (R. 59).

Vesicularia Dubyana (C. M.) Broth.

Singapore: Gardens (R. 627); ibidem (Binstead 81; Moeller).

Selangor: Gua Batu (R. 63, 66).

Perak: Temengoh (R. 193, 211).

Penang: Government Hill, 2500 ft. (Burkill 2885, 2887).

Vesicularia Kurzii (Bry. jav.) Broth.

Singapore: Bukit Timah (R. 435).

Perak: Tanjong Malim (Burkill 13484).

LEUCOMIACEAE.

Leucomium aneurodictyon (C. M.) Jaeg.

Pahang: Telom (R. 98).

SEMATOPHYLLACEAE.

Mastopoma impolitum Dixon.

Johore: Gunong Belumut, 3000 ft. (Holttum 10694a).

Mastopoma papillatum Dixon.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12234).

Acanthocladium scabrifolium Broth.

Pahang: Fraser Hill, 4800 ft., on tree trunk in low mossy forest (Burkill and Holttum 8730). Fruiting well. The fruit had up to now not been seen.

DISTR. Java.

Acanthocladium tenuisetum Dixon.

Pahang: Robinson Falls, Cameron's Highlands, 4800 ft. (Henderson 11719).

Trismegistia lancifolia (Harv.) Broth.

Singapore: Bukit Timah (R. 315, 331); Gardens (R. 606).
 Johore: Gunong Pantu (R. 265); Gunong Pulai (Nur 7772).
 Pahang: Telom (R. 123); Gunong Tahan (Haniff and Nur 8075).
 Perak: Bujong Malacca (R. 138); Batai & Padang (Strese-
 mann 90).
 Penang: (Curtis, in herb. Mitten); near Crag Hotel (Burkill
 756.)

var. **Korthalsii** (Doz. and Molk.) Fleisch.

Selangor: Bukit Hitam (Kelsall 209).
 Perak: Gunong Berumban (R. 115, 130).

Trismegistia rigida (Reinw. and Hornsch.) Broth.

Common and widely distributed.

Trismegistia Brauniana (Bry. jav.) Fleisch.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12233a).

Trismegistia calderensis (Sull.) Broth.

Pahang: Gunong Tahan (R. 31).
 DISTR. Philippines.

Meiothecium microcarpum (Harv.) Mitt.

Singapore: common.
 Selangor: Gua Batu (R. 633); Ginting Bidai (R. 409).
 Penang: common.

var. **lineolatum** (Duby) Bry. jav.

Singapore: (Fleischer).
 Malacca: (Fleischer).

Meiothecium Jagori (C. M.) Broth.

Fleischer records this from "Malacca" (the original gathering), and Singapore. I must confess that I am quite unable to grasp the difference between this and *M. microcarpum*. The characters given by different authors are slight, elusive, and sometimes contradictory, and the distribution of the two—a wide one—is practically identical.

Meiothecium scaberulum Dixon.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12237).

Rhaphidostegium complanatum Dixon.

Perak: Reservoir, Padang Rengas (Haniff 14981).

Rhaphidostegium coespitosum (Sw.) Jaeg. (*R. tristiculum* (Mitt.) Jaeg.).

Singapore: Gardens (Moeller).
 Malacca: (Fleischer) (See note on *Taxithelium decrescens*).
 Perak: Tapah (R. 163).
 Penang: (Fleischer).
 Setul: (Ridley 235).

Rhaphidostegium tristiculum is exactly identical with the S. American and African plant which has passed under so many names.

Rhaphidostegium microcladum (Doz. and Molk.) Jaeg.

Singapore: Woodlands (R. 259); Kranji (R. 270); Sungei Jurong (R. 363).

Rhaphidostegium saproxylophilum (C. M.) Jaeg.

Singapore: Selitar (R. 805); Bukit Timah (R. 457).

Johore: Gunong Belumut (Holtum 10816).

Trengganu: Kuala Trengganu (Holtum 15187).

Kelantan: Foot of Gunong Sitong (Nur 12259).

Rhaphidostegium sp.

Penang: Penang Hill (R. 551).

Unnamed in herb. Mitten. A scrap, or two of a plant unknown to me, possibly a *Rhaphidostegium* very near to *R. cupilliferum* Thw. and Mitt., but also possibly a *Stereodon* (Pseudo-*Rhaphidostegium*).

Rhaphidostegium densirameum Dixon.

Penang: Crag Hill (Binstead 62).

Trichosteleum hamatum (Doz. and Molk.) Jaeg.

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holtum 8709).

Perak: Batang Padang (Stresemann 94). Gunong Batu Puteh, 3400 ft. (L. Wray Jr. 1212), as *Trichosteleum Wrayi* Broth. It appears to me to be one of the forms of this species.

Penang: Gardens (Binstead 53; Moeller; R. 647).

Herzog (*Hedwig*. lxi, 298) says of this "Eines der verbreitetsten Moose der Malaya." This is no doubt true of the general distribution, which is a very wide one in the coastal and insular regions at least of the tropical old world; but its occurrence in the peninsula appears to be rather local. I have not seen it from many localities.

Trichosteleum laciniatum Dixon ined.

Kedah: Pulau Lankawi (Holtum 17420).

The following group is a very perplexing one; *T. Boschii*, *T. singapurens*, *T. monostictum*, and *T. brachypelma* appear to me very closely allied and indeed intergrading species, differing from one another practically only in the length and degree of acumination of the leaf-point, and the length and degree of papillosity of the seta; all characters which vary greatly and are not always, to say the least, correlated with one another. The degree of papillosity of the cells, also varies very greatly, and this too seems scarcely to be correlated with any of the other characters.

Trichosteleum Boschii (Doz. and Molk.) Jaeg.

Common and widely distributed.

(*T. laxirete* Broth. MS. appears to me inseparable from *T. Boschii*).

Trichosteleum singaporense Fleisch.

Singapore: Gardens (Fleischer, Ridley, and others); the type is Fleisch, *M. Frond. Arch. Ind.* 383.

Malacca: Mt. Ophir (R. 730).

Negri Sembilan: Gunung Tampin (Burkill 3091); Perhentian Tinggi (R. 764).

Selangor: Rawang (R. 401).

Perak: Bujong Malacca (R. 737).

Dindings: Lumut (R. 776).

The main character of this species appears to be the seta smooth or practically so at apex, and the leaves less papillose. Fleischer describes it as having the leaves somewhat more broadly and shortly pointed than in *T. Boschii*; but my specimen of his No. 383 has them decidedly more gradually and longly acuminate than e.g. as figured for *T. Boschii* in the *Bry. javanica*.

Trichosteleum monostictum Thw. and Mitt. var. **laevius** Dixon.

Singapore: Bukit Timah (R. 588, 589).

Perak: Grik (Burkill 12389).

These plants agree with the South Indian plant which I described in the *Records of Bot. Survey of India* vi, 86; but I greatly doubt whether it be anything more than a form of *T. Boschii*. *T. monostictum* (type) differs from that species only, as Fleischer points out, in having the leaf acumen longly subulate and flexuose, and it is quite probable that many of the records of *T. Boschii* should really be placed here if the species is to be retained. My own view is that all the above plants as well as *T. brachypelma* are but forms or varieties—and by no means well defined ones—of *T. Boschii*.

Trichosteleum brachypelma (C. M.) Jaeg.

Singapore: Gardens (R. 47, 597); Bukit Timah (R. 588).

Negri Sembilan: Ulu Bendul (Holtum 9885).

The plants I have referred here agree very well with the original specimens I have seen of *T. brachypelma*. They differ from *T. Boschii* in the often very short, almost smooth seta, and the papillae of the leaves very low. They are at times, however very difficult to separate from *T. Boschii*. The perichaetial leaves are occasionally somewhat lacerated at the base of the acumen, in which case the plant may be taken for a small form of *T. luxurians*.

Trichosteleum mammosum (C. M.) Jaeg.

Penang: Moniot's Rd., 2300 ft., on tree trunks (Burkill 2587); Richmond Pool, Government Hill (Haniff and Kadir 15023).

Vegetatively this is very near *T. Boschii*, though usually, I believe, somewhat more robust, and of a yellower colour; but the fruiting characters are striking.

DISTR. Java, Sumatra.

Trichosteleum albigolum Dixon in *Bull. Torr. Bot. Club* 51: 246 (1924).

Johore: 7th mile from Kluang, on fallen tree in forest (Holttum 9296b).

Perak: Tanjong Malim (Burkill 13487).

Trichosteleum luxurians (Doz. and Molk.) Broth.

Singapore: Chan Chu Kang (R. 802).

Malacca: Mt. Ophir (R. 239).

Penang: Penang Hill (R. 578; Binstead 63, 66, 70); Moniot's Rd., 2300 ft. (Burkill 2589).

This at its best is a very fine and beautiful moss; but several of the above plants are smaller and less distinct, and when this is the case it may be difficult to separate from *T. Boschii* (see note on that species).

Fleischer remarks that he has not seen Javan specimens, and his figures are no doubt drawn from the Sumatran plant; it will be noticed that they differ very widely in leaf-form from those of the *Bry. javanica*. The Malayan specimens all agree with the latter. It is a species that evidently needs further study, and one or two of the records given above, viz. R. 578, and Binstead 66, 70, may have to be transferred.

Trichosteleum Bruchii (Doz. and Molk.) Broth.

Singapore: Chan Chu Kang (R. 439) (*Acanthocladium bifarium* Mitt. MS. in herb.); Sungei Jurong (R. 369).

Johore: Gunong Panti, on small shrub (Holttum 15039).

Selangor: Petaling (R. 834); Petaling, 10th mile, a form with very long, flexuose, microphyllous flagella (R. 845).

Pahang: Tahan Woods (R. 825); Kuala Lipis (Burkill 17088).

Perak: Tapah (R. 145); Gunong Keledang (R. 715, 718, 745).

Penang: Richmond Pool, Government Hill (Haniff and Kadir 15009).

Several of the above plants are in fruit.

DISTR. Sumatra, Borneo.

Trichosteleum leptocarpon (Schwaegr.) Fleisch.

Singapore: Bukit Timah (R. 358).

DISTR. Java, Sumatra, Borneo, Ceylon.

ACROPORIUM Mitt. 1868 (*Semulophyllum* Mitt. 1864 p.p.). See my note on this genus in *Bull. Torr. Bot. Club* 51: 247-8.

Acroporium asperifolium (*Sematophyllum asperifolium* Thw. and Mitt.) Dixon comb. nov.

Singapore: Selitar (Ridley, sine numero, det. Broth.).

DISTR. Ceylon.

Acroporium rufo-aulae (*Sematophyllum rufo-aulae* Thw. and Mitt.) Dixon comb. nov. (Syn. *A. serrulatum* Dixon in *Bull. Torr. Bot. Club* 51, 249).

Malacca: Mt. Ophir (R. 715).

Penang: Penang Hill (R. 547, 750).

DISTR. Ceylon.

Since the publication of *A. serrulatum* I have ascertained that it is identical with the Ceylonese species of Thwaites and Mitten.

Acroporium leucophyllum Dixon *op. cit.* p. 250 (1924).

Pahang: Gunong Tahan, on wood (R. 1032).

Acroporium bogoricum (Bry. jav.) Dixon comb. nov. (*Hypnum bogoricum* Bry. jav.).

Perak: Batang Padang (Stresemann 95).

DISTR. Java, Borneo.

Acroporium clastobryelloides Dixon.

Penang: Crag Hill (Binstead 50).

Acroporium perangustifolium Dixon.

Kelantan: Gunong Sitong, 2600 ft. (Nur 12246a).

Acroporium punctuliferum (Thw. and Mitt.) Fleisch.

Pahang: Fraser Hill (R. 280).

Perak: Gunong Hijau 4700 ft. (Burkill 12637).

Penang: Penang Hill (R. 552).

DISTR. Ceylon.

A. punctuliferum is in habit and indeed in many other points much like the smallest forms of *A. rufum*; as I understand it, it may best be distinguished by the cuspidate, penicillate tips of the branches.

Acroporium lamprophyllum (Mitt.) Fleisch.

Malacca: Mt. Ophir (R. 765).

Pahang: Gunong Tahan (Robinson).

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12232a).

Acroporium subulatum (Hampe) Dixon comb. nov. (*Hypnum subulatum* Hampe).

Pahang: Telom (R. 139).

Fleischer states that the *H. subulatum* of the Bry. jav. is not Hampe's plant, but a fertile form of *A. diminutivum* (Brid.) Fleisch. (*H. gracilicaule* Bry. jav.). I am unable to say to which of the two the Pahang plant—which was determined by Brotherus—belongs.

Acroporium decipiens (Dixon) Dixon comb. nov. (*Sematophyllum decipiens* Dixon in *Journ. of Bot.* lvii, 77).
Selangor: Bukit Hitam (R. 118).

DISTR. Borneo.

Acroporium convolutum (Bry. jav.) Fleisch.

Johore: Gunong Panti (R. 260).

Perak: Taping (R. 197); Temengoh (R. 212) f. *papillosa* (*Sematophyllum perpapilliferum* Broth. MS.); Tanjong Malim (Burkill 13180).

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7123).

Acroporium rufum (Hornsch. and Reinw.) Fleisch. (*Sematophyllum Braunii* (C. M.) Jacq.

Malacca: Mt. Ophir (R. 226).

Johore: Gunong Belumut, 3000 ft. (Holtum 10691, 10699, 10701, 10702, 10760).

Pahang: Gunong Tahan, 5500-7000 ft. (Haniff and Nur 7904); ibidem (R. 1025b).

Perak: Gunong Hijau, 4700 ft. (Burkill 12262).

Penang: (Ridley, sine numero, herb. Mitten).

Kedah: Kedah Peak, 3000 ft. (Holtum 14899).

A common and highly variable moss, simulating at times several and very diverse species. It may generally be known when in fruit by the highly papillose seta, but I have forms with almost smooth setae which I can place nowhere else.

Acroporium rigens Broth.

Johore: Gunong Belumut, 3000 ft. (Holtum 10998).

Malacca: Mt. Ophir (R. 237, 722).

var. **dicranolomoides** (Broth.) Dixon.

Pahang: Gunong Berumban (R. 131).

Perak: Gunong Batu Puteh (Wray 391), as *Eucamptodon Wrayi* Broth. in sched. in Herb. Kew.

Acroporium obscurum Broth. & Dixon in *Bull. Torr. Bot. Club* 51: 251 (1924).

Johore: Sedenak (R. 76).

Perak: Gunong Batu Puteh, 3100 ft. (L. Wray Jr., 977).

This was labelled *Sematophyllum Wrayi* Broth., but it has already been published under the above name.

Penang: Penang Hill (R. 538).

Acroporium secundum (Hornsch. and Reinw.) Fleisch.

Common and very variable.

The more important varieties are vars. *latifolium* (Bry. jav.) Fleisch. and *angustifolium* Fleisch., which intergrade with the type and are difficult to define, but which in their extreme forms are

very marked; and var. *minus* Ren. and Card., which is very marked and well defined, and may possibly be a distinct species. I have localities for these as follows:—

var. *latifolium* (Bry. jav.) Fleisch.

Selangor: Bukit Hitam (R. 381, 430).

Pahang: Kuala Tembeling (R. 823).

var. *angustifolium* Fleisch.

Selangor: Semangkok Pass (R. 279, 289).

Pahang: Fraser Hill (Burkill and Holttum 8398, 3741, 8910); Telom (R. 134, 141, as *Sem. spurio-obscurum* Broth. MS.).

Perak: Gunong Hijau, 1700 ft. (Burkill 12638).

Kelantan: Sungei Keteh (Nur 11989).

Penang: Penang Hill (R. 524).

Kedah: Gunong Raya, Lankawi Is. (Haniff and Nur 7121);

Kedah Peak (Holttum 14892).

var. *minus* Ren. and Card.

Pahang: Gunong Tahan (R. 1005, 1008a, 1022, 1027).

Kelantan: Gunong Sitong, 2600 ft. (Nur 12232c, 12246a).

var. nov. *longisetum* Dixon. Seta ad 4 cm. alta, supreme tuberculis humillimis numerosis praedita.

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12233 a).

A striking plant, robust, and similar to var. *latifolium* vegetatively; but with a very long seta, densely "platytuberculous" above.

A form with the leaves remarkably strongly and regularly falcate-secund was collected by Holttum on Kedah Peak (14842).

A plant from Kelantan, Ulu Sungei Keteh (Nur 12272), has the perichaetial leaves (the inner ones) with very short, erect points, not flexuose as usual, and the upper cells remarkably narrow, the walls being 2-3 times as wide as the extremely narrow, sinuose lumen. In other respects it seems to agree with *A. secundum*.

A further plant, which I have seen from two localities—Malacca, Mt. Ophir (R. 714), and Penang Hill (R. 543), presents considerable difficulty, the seta being about 1.5 cm. high, and rather strongly papillose above. The only perichaetium dissected was clearly female only; this and the length of the seta appears to exclude *A. sigmatodontium*, which it otherwise resembles. It is possible that it may belong to var. *latifolium*, and that the seta is characteristic of that var., which according to Fleischer has only been found sterile.

Acroporium longicuspis (Broth.) e Dixon in *Bull. Torr. Bot. Club* 51: 254 (1924).

Selangor: Bukit Hitam (R. 391).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill 8711); Gunong Berumban, 5000 ft. (Henderson 11766).

Perak: Taiping (R. 200).

Acroporium albidissimum Dixon *op. cit.* p. 255.

Pahang: Gunong Tahan (R. 1023b).

Kelantan: Ulu Sungei Ketch (Nur 12272a).

Acroporium Ridleyi Dixon *op. cit.*, p. 256.

Pahang: Gunong Tahan (R. 1039).

Acroporium hamulatum (Fleisch) Fleisch., f. *procumbens* Fleisch.Perak: Gunong Hijau, 4000 ft. (Burkill 12635); do. 4700 ft.
(L. Wray Jr. 1883).

DISTR. Java.

Acroporium falcifolium Fleisch.

Pahang: Gunong Tahan (R. 1025a).

Kedah: Journey to Kedah Peak (Paniff).

DISTR. Java, Sumatra, Borneo, Celebes, Philippines.

Acroporium sigmatodontium (C. M.) Fleisch.

Penang: North of the Crag Hotel (Burkill 754).

Acroporium oxyporon (Bry. jav.) Fleisch.

Penang: Penang Hill (R. 521).

DISTR. Java, New Guinea, ? Ceylon.

Acroporium denticulatum Dixon in *Bull. Torr. Bot. Club* 51: 252 (1924).

Pahang: Fraser Hill, 4000-4370 ft. (Burkill and Holttum 8715a).

Acroporium hermaphroditum (C. M.) Fleisch.

Pahang: Gunong Tahan (R. 1008).

Acroporium monoicum (Bry. jav.) Fleisch.

Perak: Taiping Hills (Anderson 311).

Penang: Penang Hill, 2400 ft. (Burkill 2611; R. 716, 771, 786).

Acroporium aciphyllum Dixon *op. cit.*, p. 253 (1924).Pahang: Gunong Tahan (R. 1017, 1029); *ibidem*, a form with leaves spreading, not falcate (R. 1037).**Acroporium stramineum** (Hornsch. and Reinw.) Fleisch.
(*Sematophyllum hyalinum* (Reinw.) Jaeg.).

Kedah: Kedah Peak 3000 ft., on rock (Holttum 11893); on shrub, Holttum (15111).

Acroporium procerum (C. M.) Fleisch.

Pahang: Gunong Tahan (R. 1013; Haniff and Nur 8000).

This magnificent species has hitherto been known from a few localities in Java and Sumatra, and there only known sterile. Both the above gatherings are in fruit, though in both cases only setae are present.

Acroporium pycnophyllum (C. M.) Dixon.

Dindings: Lumut (R. 774).

DISTR. Java: a single locality only.

Acroporium malayanum Dixon *op. cit.*, p. 257 (1924).

Penang: Bot. Gardens (Binstead 57).

Acroporium complanatum Dixon *op. cit.*, p. 256.

Malacca: base of Gunung Ledang (R. 236).

Acroporium surculare Dixon *op. cit.*, p. 258.

Perak: on twigs, Bidor Rd., Tapah (R. 153).

Penang: Penang Hill (R. 551).

Piloecium pseudo-rufescens (Hampe) (C. M.)

Singapore: (St. V. B. Down, herb. Binstead: Fleischer).

Johore: Sungei Bau (R. 321).

Perak: Gunong Keledang (Ridley, sine numero, herb. Mitten).

Kelantan: Ulu Sungei Keteh (Nur 12272b).

RHEGMATODONTACEAE.**Macrohymenium Muelleri** Doz. and Molk.

Pahang: Gunong Tahan (R. 1035).

DISTR. Java, Sumatra, Borneo.

BRACHYTHECIACEAE.**Rhynchostegium javanicum** (Bé.) Besch.

Perak: Temengoh (Ridley, sine numero, det. Brotherus).

HYPNODENDRACEAE.**Hypnodendron arborescens** (Mitt.) Lindb.

Singapore: Gardens jungle (Ridley 704); Chan Chu Kang (R. 438).

Pahang: Tahan R., (R. 234); Fraser Hill, 3900 ft. (Holttum 11373). Hill 3 miles from summit of Gunong Benom, 5000 ft. (Barnes).

Perak: (Wray, sive Fleischer).

Penang: (Curtis); Penara Bukit (R. 575); Penang Hill (R. 507, 511, 755); Balik Pulau (R. 754).

Hypnodendron Junghuhnii (C. M.) Lindb.

Selangor: Petaling (R. 483).

Pahang: Gunong Tahan (Robinson, R. 1014, 1034); Fraser Hill, circa 3800 ft. Holttum 11497); Telom (R. 128).

Perak: Gunong Berumban (R. 86, 106); Gunong Ulu Kali (Ridley).

DISTR. Java, Sumatra ?Celebes.

Hypnodendron Wrayi Broth. MS. Perak: On ground, Gunong Batu Puteh, 4500 ft. (L. Wray Jr. 301).**Mniodendron divaricatum** (Hornsch. and Reinw.) Lindb.

Malacca: Mt. Ophir (Ridley, sine numero, dt. Brotherus).

Pahang: Gunong Tahan (Robinson); ibidem (R. 1010); Kluang Terbang (Barnes).

Perak: Summit of Gunong Batu Puteh (Wray 892).

Penang: Penang Hill (Curtis 2733; R. 230, 516); Richmond Pool (Burkill 2601). (Curtis record may be based on the plant which is really *M. Mittenii*; v. infra).

Kedah: Kedah Peak (Ridley; Haniff 2; Holttum 14864).

Kelantan: Gunong Sitong, circa 2600 ft. (Nur 12238).

In continental Asia only known elsewhere from Annam.

Mniodendron Mittenii Salmon.

Selangor: Bukit Hitam (R. 429).

Pahang: Gunong Tahan, 7000 ft. (Haniff and Nur 7906; R. 15, 1004, 1031).

Perak: Bujong Malacca (R. 721).

Penang: Government Hill (Curtis), as *Mniodendron Curtisii* (C. M. n. sp., Herb. Binstead, but it is quite inseparable from *M. Mittenii*).

THE GARDENS' BULLETIN STRAITS SETTLEMENTS

Vol. IV.

March, 1927.

Nos. 2 & 3

Some old photographs of the Singapore Gardens

By the courtesy of the Director of the Royal Botanic Gardens, Kew, we have been provided with a set of old photographs of the Singapore Gardens, which we believe have never been published. They were taken about the year 1877, when H. J. Marston was Superintendent.

On the accompanying plates we publish a photograph from this collection taken on the top of the Bandstand Hill (Plate I), and a recent one taken as nearly as possible from the same position (Plate II).

The old photograph takes in a wider angle than the recent one, and it is not possible to make the two match exactly, but they have certain features in common which enable a comparison to be made. The Bandstand area itself is evidently the same now as in early days. In the recent picture the extreme right-hand portion of the raised area, and the palms which adjoin it, are not shown; the other palms of the ring (*Actinorhynchus edapparia*) are seen, though their heads could not be included in the picture.

The fine tree of *Koompassia maluccensis* is prominent in the background, near the middle of both pictures; evidently in 1877 it was nearly as tall as now, and its age must be considerable. On the right of the recent photograph appears the beautifully regular form of a jelutong tree (*Dyera costulata*): the dark tree on the right of the old picture may be the same individual, or possibly the *Artocarpus lanceifolia* which is very close to it. On the right of the *Koompassia* in 1877 is seen a clump of the traveller's palm (*Ravenala*). This still exists, but is hidden by the congee bush in the foreground of the recent photograph. The large tree in the background on the left of the old photograph is probably the fine *Shorea leprosula* (Seraya batu) killed by lightning in 1909 (see Agric. Bull. S.S. and F.M.S., Vol. VIII, plate opposite p. 361).

On the left of the picture of 1877, in the background, appear trees covered with creepers. These trees stand between the Upper

and Lower Ring roads round the Hill. In Murtou's reports of 1877 and 1878 it is recorded that a fern rockery was started under some trees in this position, but their death and collapse in 1877, owing to the smothering of creepers which grew over them, caused the site to become too open for ferns. The present rockery on the north-west of the Bandstand Hill was established later by Cantley, beyond the Lower Ring Road. Two other photographs (not here published) show the creeper-covered trees in closer view, and enable their position to be located fairly accurately. The creeper which smothered them was probably *Thunbergia laurifolia*, which still continually causes much trouble. It occurs in many parts of the Gardens and has frequently to be cut back, to prevent further disasters like that which spoiled Murtou's rockery.

Another photograph in the collection shows the road through the Gardens Jungle (now called Liane Road); the jungle adjacent to the road was not so well grown as now, and the road much more open. Another shows a view down Maranta Avenue, and indicates that the palm valley and its slopes, below the Director's house, had not then been planted with the palms which are now there.

Other pictures in the southern part of the Gardens show equally great changes. The island in the lake was covered by spreading trees (of which the largest was probably a Waringin) instead of the graceful clump of nibong palms and fine pandanus which now adorn it. The avenue of sealing wax palms (*Cyrtosuchys lakka*) on the south side of the Bandstand Hill had not been planted, and a view southwards from the site of that avenue shows the monkey house (then newly erected) in its original position near the present herbarium, and beyond it on the horizon the buildings of Tanglin Barracks, not then hidden by all the trees which have since grown up. It is hoped to publish others of these photographs in later issues of the Bulletin. Further details concerning the history of parts of the Gardens here mentioned are recorded in the papers published by Mr. Burkill in Volume II of the Bulletin, pp. 55-72 and 93-108.

R. E. HOLTTUM.

Additions to the Flora of the Malay Peninsula

By M. R. HENDERSON, F.L.S.

ANONACEAE.

***Goniothalamus rotundisepalus*, sp. nov.**

Frutex 1-2 m. altus. Ramuli glabri, partes juniores ferrugineo-pubescentes. Folia glabra, 14-23 cm. longa, 4.5-8.5 cm. lata, oblonga vel elliptico-oblonga, acuminata, base acuta, nervis utrinque



The Bandstand Hill Singapore Gardens about 1877



The Bandstand Hill in 1925

7-9, supra obscuris, subter tenuibus sed distinctis. Flores axillarii, solitarii, 2.5 cm. longi; sepala rotunda, glabra vel extus sparse ferrugineo-pubescentia, intus glabra; petala exteriora late lanceolata-acuta, 2.5 cm. longa, circa 1 cm. lata, interiora ovata 1.2 cm. longa, 7 mm. lata. Carpella rubro-pubescentia, anguste oblonga, stigmatibus 2-lobato.

A shrub 1-2 metres high. Branchlets glabrous, dark-coloured, the youngest twigs and buds and very young leaves with a short red pubescence.

Leaves glabrous, 14-23 cms. long, 4.5-8.5 cms. broad, oblong or elliptic-oblong, acuminate, narrowed to the base. Nerves 7-9 pairs, faint above, thin but distinct below, interarching far from the leaf margin. Reticulations indistinct.

Flowers solitary, axillary, pale-green, 2.5 cms. long. Bracts 4, ovate-acute, red-pubescent, 2-3 mms. long. Pedicels 4-5 mms. long, slender, with a few red hairs. Sepals orbicular or rotund, glabrous or with sparse red pubescence outside, glabrous inside. Petals leathery, drying black, the outer with a scattered red pubescence on both sides, broadly lanceolate-acute, narrowed to the truncate base, 2.5 cms. long, about 1 cm. broad; the inner ovate, red-pubescent on the outside like the outer petals, but with a denser brownish mealy pubescence inside which is more pronounced at the cohering edges, and is almost absent at the base, 1.2 cms. long, 7 mms. broad. Stamens numerous, the appendages orbicular, pubescent. Ovaries linear-oblong, red-hairy, style rather stout, with two thick stigmas. Fruit unknown.

Sungai Rinong, Kelantan, Md. Nur (with Dr. Foxworthy) 12157, February 1924.

***Drepananthus pahangensis*, sp. nov.**

Arbor circa 3 m. alta. Folia elliptica vel elliptico-oblonga, base inaequilateralia, rotundata vel leviter cordata, acuminate, 17-29 cm. longa, 7-12 cm. lata, nervis utrinque 12-15. Sepala triangulo-acuta, 7 mm. longa et lata. Petala exteriora oblonga, 1.7 cm. longa, 7 mm. lata, interiora conniventia, 1.3 cm. longa. Carpella supra glabra, subter sericeo-pubescentia.

A tree about 3 metres tall. Young branches terete, red-pubescent, lenticellate. Leaves elliptic or elliptic-oblong, broadest near the apex, base inaequilateral, rounded or slightly cordate, apex acute, dark brown (when dry) and glabrous above except for the nerves, brown below; 17-29 cms. long, 7-12 cms. broad. Nerves 12-15 pairs, fine on the upper surface and red tomentose like the sunk midrib, prominent below and interarching, sparsely pubescent. Reticulations faint above, prominent and regular below, pubescent like the nerves.

Flowers yellow, one or two on a short woody tubercle. Peduncle stout, up to 2 cms. long (but usually shorter), with ovate-acute bracts up to 5 mms. long, the peduncle and bracts red-hairy. Sepals and petals leathery, pustulose, with a sparse reddish pubescence. Sepals triangular acute, base broad, edges thickened, 7 mms. long and broad. Outer petals oblong, narrowed to the rounded tip, slightly constricted above the claw and arching over the base of the inner petals, but not connivent, the claw glabrous inside, the arch with a yellowish mealy pubescence, edges of limb incurved, 1.7 cms. long, 7 mms. br ad. Inner petals connivent similar in shape to the outer, but smaller, strongly constricted above the claw, keeled on the back, 1.3 cms. long. Stamen appendages glabrous, hexagonal. Ovaries glabrous above, silky pubescent below with long yellowish hairs. Fruit unknown.

Pahang: Kuantan, Burn-Murdoch, May 1924; Baloh Forest Reserve, Forest Department 830, March 1919, and 3141, March 1920; Pulau Manis, Forest Department 824, September 1919.

Johore: Gunung Pantai, altitude 1000 feet, R. E. Holttum, April 1925. Malay name "Antoi."

BALSAMINACEAE.

Impatiens Foxworthyi, sp. nov.

Herba reptans succulenta, 2-2.5 cm. alta, glabra. Folia petiolis ad 9.5 cm. longis, 6.5-8 cm. longa, 4.5-6 cm. lata, ovata, mucronata, margine denticulata. Inflorescentiae ad 20 cm. longae, pedicellis bracteatis. Sepala latiora ovato-rotundata, 5 mm. longa 4-5 mm. lata, interiora parva, linearia, 4 mm. longa. Labellum limbus amplius, calcar robustum, incurvatum; v. callem ovatum, 8 mm. longum, apice mucronato; alae 1 cm. longae, sessiles, bilobae. Filamentum brevius; antherae oblongae.

A creeping and ascending succulent herb, 20-30 cms. high, glabrous. Leaves 6.5-8 cms. long, 4.5-6 cms. broad, crowded towards the top of the stem, ovate, thin, the margin with small spinulose teeth, the apex mucronate, the base narrowed and decurrent on the petiole. Petioles variable in length from 1.5 to 9.5 cms.

Inflorescences axillary or subterminal, peduncles glabrous, succulent, branched once, up to 20 cms. long. Flowers crowded towards the ends of the branches, the fallen ones leaving prominent scars. Bracts similar to the sepals, but slightly smaller, conspicuous and persistent. Pedicels slender, up to 1 cm. long.

Flowers yellow. Sepals 5, the laterals 5 mms. long, 4.5 mms. broad, ovate-rotund, oblique, slightly keeled, notched at the top with a thick blunt mucro in the notch: the inners narrow, linear, broadened at the base, 4 mms. long; the posterior sepal large, 1.5

cms. long and about 1 cm. across the mouth, the limb triangular with a short thick blunt point at the mouth, the spur stout, incurved, about as long as the limb. Petals: the vexillum ovate, 8 mms. long and 4 mms. broad, the keel prominent at the base and produced at the notched tip into a triangular point; the wings 1 cm. long and 8 mms. broad, sessile, two-lobed, the lobes rounded and nearly equal, the dorsal spur prominent, slightly down-curved. Stamens coloring, filaments short, anthers oblong. Fruit unknown.

On limestone rocks at Gua Kechapi on the Pahang-Kelantan boundary, Md. Nur (with Dr. Foxworthy) 11912, February, 1924.

OLACACEAE.

Phytocrene trichura, Ridl., *Flor. Malay Pen., Vol. II., p. 433*.

This plant was first collected by Mr. Ridley in the Ulu Batang Padang, Perak, in 1909, and was not again obtained until June 1923 at Lubok Tamang, Pahang, on the Bertam River. Mr. Ridley could not procure leaves, owing to the height to which the plant climbed, and described it from inflorescences only. The following is a short description of the leaves:—

Stem longitudinally wrinkled, red hairy. Leaves ovate cordate, deeply three-lobed, the lobes acuminate, the terminal lobe long and broad. Upper surface rough with greenish pubescence on the main nerves and sparse reddish hairs on the faint raised reticulations; nerves and reticulations below with bristly reddish hairs. Nerves three from the base, the main nerves and reticulations elevate and bold beneath; 12-15 cms. long, 10-11 cms. broad. Petiole roughly hairy, 4.5-5 cms. long.

Lubok Tamang, Pahang, altitude 3500 feet, June 1923. Coll: M. R. Henderson, F. M. S. Museums No. 10928.

SCROPHULARIACEAE.

Herpestis floribunda, R. Br. *Bacopa floribunda*, Wettst.

Not previously recorded from the Malay Peninsula. Collected in padi-fields at Padang Lerang, Kuala Trengganu, by R. E. Holtum, no. 17353, May 1925.

Distribution:—India to Australia.

ASCLEPIADACEAE.

Dischidia Fultonii, sp. nov.

Herba epiphytica. Folia carnulosa, exsiccata coriacea, ovata vel ovato-lanceolata, acuta, glabra, 1.5-1.9 cm. longa, 1 mm. 1.2

cm. lata, nervis obscuris. Pedicelli ad 1.5 mm. longi, crassi. Sepala membranacea, ovata, obtusa, 1 mm. longa, squamis minutissimis. Corolla alba, lobis rubicundis; tubus urceolus, 1 mm. longus. Coronae lobi erecti, membranacei, lobis recurvatis, acutis. Folliculi 5 cm. longi, glabri

A slender trailing or pendent epiphyte. Stems slender, pale below and minutely papillose, dark brown above, longitudinally wrinkled when dry. Leaves fleshy, coriaceous when dry, ovate or ovate-lanceolate, acute, glabrous, edges not recurved, both surfaces irregularly wrinkled when dry, 1.5-1.9 cms. long, 7 mms.—1.2 cms. broad. Nerves quite invisible. Petiole stout, 1 mms. long.

Umbels about 5-flowered on thick tubercled and bracteate rachises which are either supported on peduncles 2.5-3.5 cms. long, minutely papillose and longitudinally wrinkled like the stem, or are sessile in the leaf axils. Pedicels stout, up to 1.5 mms. long. Calyx lobes membranous, ovate obtuse, 1 mm. long. Scales very minute. Corolla white tipped with pink, tube urceolate, 4 mms. long, globose below, contracted at the mouth, glabrous except for the inside of the lobes, which are densely hairy. Corona erect, large, the lobes membranous, broadly anchor shaped, the recurved arms of the lobes long, acute.

Follicle 5 cms. long, glabrous, linear acuminate, slightly curved.

Johore: Gunong Belunt, altitude 3000 feet, R. E. Holttum 10727, May 1923.

GESNERACEAE.

***Didymocarpus lancifolia*, sp. nov.**

Herba 10-13 cm. alta. Folia petiolis 5 mm. longis, lanceolata, 2.8-3 cm. longa, 8 mm.-1 cm. lata, supra sparse pilosa, subtus nervis densissime pilosis. Pedunculi 1-floriferi, 2.6 cm. longi, rufi, pubescentes. Sepala linearia, lanceolata, pilosa, 2.5 mm. longa. Corolla alba; tubus cylindricus, superne dilatatus, 2 cm. longus; lobi rotundati. Stamina 2, filamenta 5 mm. longa. Ovarium cum stylo et stigmate pubescens.

A creeping and ascending herb, stem woody, hispid, 10-13 cms. tall. Lower part of the stem leafless, the leaves crowded towards the top. Leaves lanceolate, 2.8-3 cms. long, 8 mms.-1 cm. broad, narrowed to the apex and base, the upper surface sparsely covered with long soft hairs, becoming more dense on the edge, the lower surface densely hairy on the nerves. Nerves 4-6 pairs distinct below. Petioles hispid, 5 mms. long.

Peduncle one-flowered, 2.6 cms. long, red-coloured, pubescent; pedicel 6 mms. long. Calyx lobes 5, linear lanceolate, hairy, 2.5 mms. long. Corolla narrow, cylindric, dilated at the top, 2 cms.

long, slightly pubescent outside, lobes rounded; white, with two brown lines on the lower lip and a tinge of mauve round them. Stamens inserted one-third of the way down the corolla tube, filaments 5 mms. long, rather thick. No trace of staminodes. Disc conspicuous, one-sided, slightly lobed. Ovary, style and stigma all pubescent, the style reaching to the anthers, the stigma large, capitate. Fruit unknown.

Pahang: Gorge of the Sungai Tras near Raub, altitude 500 feet, I. H. Burkill and Md. Haniff 16946, November 1921.

***Loxocarpus papillosa*, sp. nov.**

Folia petiolis 1 cm. longis, obovata vel obcuneata, 6-11 cm. longa, 2.5-4 cm. lata, apice et base rotundata, nervis utrinque 10-12. Pedunculi 1-floriferi, 3.5-6.5 cm. longi. Sepala linear-oblonga, pubescentia. Corolla coerulea, 5 mm. longa, leviter pubescens; tubus campanulatus, lobis oblongis, rotundatis. Stamina 2, filamenta breviter et crassa; antherae rotundatae, conniventes. Ovarium cum stylo pubescens. Capsula 7-9 mm. longa.

A stemless herb with the leaves in a rosette. Leaves obovate or obcuneate, apex rounded, base rounded and sometimes inequilateral, 6-11 cms. long, 2.5-4 cms. broad, the midrib, nerves and occasionally the intervening spaces on the upper surface with long hairs, which form a more or less uniform covering on the lower surface and on the margin. Nerves 10-12 pairs, thin but distinct on the lower surface, regular and parallel. Petiole densely hairy, 1 cm. long.

Scapes slender, reddish, pubescent, pale and glabrous when older, 3.5-6.5 cms. long, one-flowered. Sepals linear oblong, pubescent. Corolla pale blue, 5 mms. long, slightly pubescent, the tube wide, campanulate, lobes oblong, rounded, rather deep. Stamen filaments short, thick, the anthers round, peltate, connivent. No staminodes. Ovary and style pubescent, the style as long as the corolla tube, stigma small, capitate. Capsule 7-9 mms. long, red pubescent, narrowly conic, straight, splitting along the upper edge, the style persistent. Seeds narrowly elliptic, reticulate.

Negri Sembilan: North side of Gunong Angsi, altitude 2600 feet, Md. Nur 11632, November 1923. Gunong Angsi, altitude about 2000 feet, R. E. Holttum 9923, December 1922.

***Paraboea Holttumi*, sp. nov.**

Herba erecta. Folia petiolis 1.5-3 cm. longis, 8-11 cm. longa, 1.5-2 cm. lata, lanceolata, nervis obscuris. Pedunculi circa 5.5 cm. longi; bractae angustae, 3 mm. longae. Calycis sepala linearilanceolata, hispida, 3.5 mm. longa. Corolla campanulata, circa 1.2

cm. longa, extus pubescens. Filamenta crassa; antherae magnae, triangulae, conniventes. Ovarium cum stylo ferrugineo-pilosum; stigma capitatum.

A herb with a stiff habit, about a foot tall. Stems woody, terete and glabrous below, above 4-angled and channelled. Leaves 8-11 cms. long, 1.5-2 cms. broad, in distant pairs, lanceolate, narrowed to both ends, texture thick, nerves invisible; the upper surface minutely papillose with scattered white multicellular hairs, more numerous on the young leaves and towards the margin, where they form a regular row; the lower surface rugulose, the hairs, which are similar to those on the upper surface, with a reddish tinge. In life the leaves are dark green above and dark purplish below, and this latter colour persists after drying as a reddish tinge. Petioles 1.5-3 cms. long, the younger ones with a few hairs.

Peduncle sparsely pubescent at base, more densely so towards the apex, about 5.5 cms. long. Branches short with 3 or 4 flowers on each. Bracts narrow, about 3 mms. long. Calyx tube very short, lobes linear lanceolate, hairy, 3.5 mms. long. Corolla campanulate, about 1.2 cms. long, pubescent outside, slightly two-lipped. Filaments rather long, thick, glabrous except at their point of insertion on the corolla, where they are covered with white hairs. Anthers large, connivent, triangular. Ovary and style red-hairy, stigma capitate. Flowers in bud pale yellow. Fruit unknown.

Johore: Gunong Belumut, altitude 3000 feet, R. E. Holtum 10685, May 1923.

This species is near *P. campanulata*, *Ridl.*, but differs in the thicker and narrower leaves, the narrower corolla, and the longer filaments of the stamens.

ACANTHACEAE.

Hemigraphis Ridleyi, *Clarke*, var. *nervosa*, n. var.

This variety differs from typical *H. Ridleyi* in the smaller leaves (3 cms. long and 2 cms. broad), which are broad at the base with a tendency to become cordate, and not cuneate; in the increased pubescence on both surfaces of the leaves, and the absence of raphides; and in the more conspicuous and elevated nerves and reticulations. The flowers are as in *Ridleyi*, except that the bracts are longer (1-1.5 cms. long) and also the calyx lobes (6 mms. long).

Pahang: Railway banks at Kuala Lipis, I. H. Burkill and Md. Haniff 15699, November 1924.

LORANTHACEAE.

Loranthus pekanensis, sp. nov.

Frutex parasiticus, ramulis glabris teretibus. Folia petiolis 1.5-2 cm. longis glabra, coriacea, ovata, apice rotundata, base cuneata, 9-10 cm. longa, 6-6.5 cm. lata; costa subter prominens; nervi laterales utrinque 3 vel 4. Flores 20-30 in fasciculis axillariis; pedicelli 4 mm. longi. Calycis tubus 4 mm. longus, urceolatus, limbo minuto denticulato. Corollae tubus 1.3-1.6 cm. longus, luteo-flavus; lobi 5, reflexi, viridi; Stamina 5. Fructus ignotus.

A shrub parasitic on *Vitex* sp. Branchlets glabrous, stout, terete, the youngest reddish brown, the lower greyish brown, lenticellate. Leaves glabrous, reddish brown when dry, in whorls of three or four, stiffly coriaceous, ovate, rounded at tip, narrowed to the base, 9-10 cms. long, 6-6.5 cms. broad. Nerves 3 or 4 pairs, just visible when dry, slightly more prominent on the upper surface than on the lower, the midrib prominent and elevate below.

Flowers glabrous except for a very fine white pubescence on the inside of the petals; in axillary fascicles of 20 to 30 on the thickened nodes. Pedicels 4 mms. long. Calyx urceolate, minutely toothed, 4 mms. long. Corolla orange-yellow, tipped with green, gamopetalous, of 5 segments, the tips of the petals reflexed, 1.3-1.6 cms. long. Stamens 5 included, style very shortly exsert. Fruit unknown.

Pahang: Pekan, I. H. Burkill and Md. Haniff 17104, November 1924.

ZINGIBERACEAE.

Alpinia Burkillii, sp. nov.

Caulis ad 2 m. altus. Folia 69 cm. longa, 10-13 cm. lata, oblanceolata, cuspidata, utrinque pubescentia; ligula 6-7 mm. longa, bifida, margine pilosa. Panicula 20-30 cm. longa; calyx circa 1.4 cm. longus, cylindricus, trilobatus; corollae tubus 1.4 cm. longus, pubescens; petala 2 cm. longa, ovato-lanceolata, extra pilosa; labellum amplum, glabrum, 2.7-3 cm. longum, 3 cm. latum. Staminodia magna, bilobata. Stamen glabrum, connectivi appendicula brevis. Capsula globosa, puberula, 2 cm. diametro.

A herbaceous plant about five feet tall. Leaves oblong lanceolate, long cuspidate, pubescent above with long regularly spaced hairs with swollen bases, softly pubescent below, 69 cms. long, 10-13 cms. broad. Petiole 2-2.5 cms. long pubescent. Ligule 6-7 mms. long, bifid, lobes rounded, long hairy on their edges. Panicle 20-30 cms. long, with a narrow pubescent sheath as long, branches 1.5-2 cms. long, all velvety pubescent. Bracts glabrous,

papery, ovate, enclosing 4 to 7 flowers on pubescent pedicels 1.5 cms. long.

Calyx cylindric, 3-lobed, rather longer than the corolla tube, glabrous except for the pubescent tips of the lobes. Corolla tube 1.4 cms. long, pubescent, with a ring of long hairs at the base. Petals 2 cms. long, ovate lanceolate, blunt, hairy on the back, the upper lobe hooded and with a conspicuous spur. Lip large, quite glabrous, 2.7-3 cms. long, 3 cms. broad; side-lobes rounded, mid-lobe bifid, the lobes truncate; margin of lip crippled; two patches of claret colour on the side lobes not reaching the margin, and a number of violet-black lines in the centre of the lip above the mid-lobe. Stamines two, conspicuous, bilobed, adnate to the base of the stamen and lip. Stamen glabrous, the connective prolonged into a short crest.

Capsule globose, puberulous, about 2 cms. in diameter and crowned by the persistent calyx.

Negri Sembilan: Gemas, I. II. Burkill 4980, August 1919.

Pahang: 126th. mile, Kuantan Road, between Sungai Lepar and Sungai Ketam, and at Sungai Luit, I. II. Burkill and M. D. Haniff 17210, 17461, November 1924.

A New Fern from the Malay Peninsula.

Syngamma minima, *Holttum* sp. nov.

Rhizoma repens, tenue, pilis nigris nitidis vestitum. Stipites approximati, 5—15 mm. longi. Frondes rigidae, in saeco fragiles, glabrae, 1—1 cm. longae, 5—8 mm. latae, obovatae vel oblanceolatae, apice rotundatae, basin versus sensim angustatae, margine cartilagineae denticulatae. Costa utrinque vix prominens; venae simplices vel furcatae, liberae vel sub margine anastomosantes, fere obscurae. Sori 1-2 mm. longi, ad venas terminales.

Gunong Pantl, Johore, Holttum 17498.

This small fern grows side by side with *S. borneensis* on sandstone rocks at the top of the ridge of G. Pantl, at an altitude of about 1600 feet above sea. It somewhat resembles the young plants of *S. borneensis*, but is distinguished clearly from its earliest stages by the shape of its leaves and by its less densely tufted habit. The shorter leaves are often quite as broad as the longer ones, and leaves hardly more than 1 cm. in length may be fertile. The leaves on young plants are more deeply toothed than those produced later. The species is allied to *S. Dayi*, but has much shorter and broader



Dipteris Lobbiana, near Gunong Pulau, Johore

leaves; *S. Dayi* also lacks the toothed cartilaginous edge. It is curious that both *S. minima* and young plants of *S. borneensis* on G. Panti are parasitised by a scale insect, such being uncommon on wild ferns in this country.

Notes on Malayan Ferns

1. *Dipteris Lobbiana*.

This interesting fern has a wide distribution in Malaysia and is quite abundant, at least over part of its range, but probably because of its peculiar habitat it was not often found by the earlier collectors. In Christ's *Farnkräuter der Erde* (1897) it is said to be a rare plant. Its collection on Mount Ophir by Lobb, together with *Matonia pectinata*, with which it probably has a common ancestry, has associated the names of the two ferns together, though in nature they do not grow side by side. *Matonia pectinata* is found on the exposed summits of a number of the highest mountains in the Malay Peninsula and at lower altitudes on some of the small islands to the south of it; *Dipteris Lobbiana* is found only on rocks by the sides of forest streams, often quite in the low country. It has been found plentifully by several streams in Johore, as well as on Mount Ophir, and also further north in Pahang (Tahan River and Sungei Perting, Bentong), in Perak (abundantly in the Palas River on Gunung Bujong Malacca, and at other localities not specified) and as far north as Kedah Peak. In Borneo Bishop Hose has stated that it is found "on the banks of most rivers in Sarawak and North Borneo at some distance above the highest point to which the influence of the tide extends." van Alderwerelt van Rosenburgh gives the distribution "Malaya," a term to which he attaches a wide meaning. Copeland records it as occurring in Celebes but the writer has seen no published record of its occurrence in Sumatra or Java, though the former is not unlikely. It is not found in the Philippines.

The present writer has seen this fern three times, on all occasions in Johore; by the Sungei Berhidong, north of Gunung Belamut, at about 450 feet above sea level, by one of the streams flowing southwards from Gunung Pulai (see accompanying plate), at a similar altitude, and in the Pelepah valley near Kota Tinggi. In descending the first-named stream from about 1600 ft., *Dipteris* was not observed in the steeper more shaded upper reaches, but appeared where the course became more level and open. The beds of all three streams are filled with granite boulders of greatly varying size; the fern grows over the boulders, its rhizomes clinging tightly to them. Sometimes by the side of the stream the boulders are covered with sand or silt, and in this case the rhizome is not

exposed; in such positions, on the edge of the jungle beside the stream, the fronds reach their largest size. The plant grows everywhere quite close to the water, sometimes on rocks in mid-stream, and it is evident that at times of flood the fronds are quite submerged. After heavy rain (which may occur at almost any time of year) such streams rise rapidly to a height considerably above their normal level. Burkill remarks of *Dipteris Lobbiana* at Bentong that "the tenacity with which it holds on to the rocks is remarkable. It grows in places where the floods must often submerge it" (note on field label). The division of the frond into narrow segments is undoubtedly of great service under such conditions; it could hardly survive if it had the broad lamina of *D. conjugata*. Further, the narrow coriaceous leaflets are a xerophytic character probably connected with the fact that the fern often grows exposed to the sun, and may be left with a restricted water supply when the stream is low.

Another fern growing under the same conditions is *Meniscium salicifolium* Wall. (*Dryopteris* C. Chr.). Its narrow entire coriaceous leaflets are quite comparable with those of *Dipteris Lobbiana*, though it has pinnate leaves and a short rhizome instead of a long creeping one. It has the same kind of relation to the broad leaved *M. cuspidatum* Bl. (which has a wider distribution) as *D. Lobbiana* has to *D. conjugata*. A third species, which is almost certainly of the same habitat, is *Aspidium semibipinnatum* Wall., from the south of the Malay Peninsula and Borneo. It has narrow ribbon-like leaflets in contrast to the broad pinnae of its allies which live in the shade of the jungle. These ferns are undoubtedly specialised to the stream bed habitat, and are not found elsewhere.

Borneo appears to be the centre of distribution of the genus *Dipteris* as it exists today, and has two peculiar species. One of these, *D. quinquefurcata* (Bak.), is very close to *D. Lobbiana*; in fact, the writer is disposed to doubt whether it is a distinct species. On the banks of the Pelepah stream above mentioned, somewhat in the shade of the edge of the jungle, were some very large fronds of *D. Lobbiana*, twice as big as many of those on the rocks in the stream bed. In these there is a very marked tendency for the sori to break up into as many as five or six smaller ones in a single areola, and the segments of the fronds reach 9 cm. in width. This condition is almost that described for *D. quinquefurcata*, and it is quite possible that the latter species, known from few specimens with little or nothing in the way of field notes, only represents an unusually large form of *D. Lobbiana*, grown under unusually favourable conditions.

Bower has suggested *Land Flora* (1908) pp. 618-632, *The Ferns* (1923) p. 226 that *D. Lobbiana* is the most primitive

member of the genus, most nearly allied to the ancestral *Matonia-Gleichenia* type. Its simple narrow divisions with a single row of rather large sori on either side of the midrib, and the fact that all sporangia in a sorus are produced simultaneously whereas the sorus of *D. conjugata* is "mixed," all point to a relatively primitive condition. At the same time it is rather remarkable that *D. lob-biana* is so well adapted to the conditions of the peculiar habitat in which alone it appears capable of living in nature. One must suppose that it is derived from an ancient type, and has retained its primitive characters on account of their suitability to its environment. It is evidently unable to grow either in the shade of the jungle or on exposed ground away from streams; in the latter position it would be crowded out by more vigorous competitors. *D. conjugata*, on the other hand, may be regarded as a more recent and vigorous type, capable of holding its own under conditions in which it has far more competitors; it has a correspondingly wider range of distribution.

2. On the production of fertile fronds by *Stenochlaena palustris*.

Stenochlaena palustris (Burm.) Bedd is a fern of wide distribution in the eastern tropics, extending from northern India and southern China through the Malayan region to Australia and into the Pacific. In Singapore it is one of the commonest ferns, especially in somewhat moist places, being frequent by roadside ditches. It will flourish with its fronds fully exposed to the sun and its stems trail long distances over the ground or climb high up tree trunks. The young fronds are tender, and are edible, but the old ones are very stiff and leathery. Usually only the sterile leaves are produced, but from time to time the narrow fertile leaves may be observed, occasionally in large numbers.

The question arises as to what are the factors determining the development of the fertile fronds. Over part, probably most, of its range, this fern is subjected to a more or less prolonged dry season. I can find no records of its behaviour under such circumstances, but it seems probable that fertile fronds are produced during the dry season, and sterile fronds only or chiefly during the wet season. Where there is a dimorphism between the sterile and fertile leaves of terrestrial ferns it is usual for the fertile to have a more or less contracted lamina, and a longer stipe, thus exposing the sporangia to a drier air than is found close to the ground, and also guarding to some extent against the consequent greater transpiration (see Copeland E. B., on the comparative ecology of the San Ramon Polypodiaceae, *Philippine Journal of Science*, C., Vol. 2, pp. 59-61). *Stenochlaena* is not essentially terrestrial, and the dimorphism is here connected most probably with a drier season, not with a drier stratum of the

atmosphere. However, there appears to be a response to the greater dryness of the air away from the ground in the production of a greater number of fertile fronds on those stems which have climbed up tree trunks; but fertile fronds are not confined to such situations, being found on the ground also.

In Singapore we have such a uniform climate that this fern has not any definite seasonal stimulus to the production of fertile fronds. The most marked wet season is usually that of the north-east monsoon, about November to January; there is usually hardly so marked a dry season, and therefore what must be supposed to be the stimulus of change from wet to dry is not often a strong one. Probably any fairly pronounced dry period will initiate the production of fertile fronds, and a very wet period a crop of sterile ones.

From the few observations I have made in Singapore it seems probable that a period of about twelve days or more with little or no rain is sufficient to induce the production of fertile fronds on some at least of the plants of this species. The position of the plant has no doubt some influence on the matter. By the time the fronds have developed the weather may be wet again. The fertility of a frond must be determined at a very early stage, while it is still coiled up in its bud, covered by overlapping dark coloured orbicular scales. I have not been able to determine exactly at what stage the form of the fronds is determined; I have only observed the production of fertile fronds on certain plants constantly under notice, and have examined the rainfall records of the preceding few weeks.

My attention was first called very strikingly to this matter in March 1923. After the wet and cloudy weather of the N. E. monsoon there came an unusually prolonged drought. From Jan. 24 to Feb. 17 there was only .4 in. of rain, nearly all of which fell on one day; on Feb. 18 there fell 1.28 in.; from Feb. 19 to March 13 only 1.7 in. During March and April there was a great abundance of fertile fronds of *Stenochlaena palustris* in the Gardens, and also on some plants outside which I happened to notice. There was a less pronounced dry period from August to October, and again abundant fertile fronds, but I have no particular observations.

1924 was much wetter than 1923, and fertile fronds were fewer. The following are observations of their appearance: March 10; a few young fertile fronds observed. The second half of February had been dry, (.88 in.) after an excessively wet first half (14.7 in.). Early June; fertile fronds on several plants. There had been a dry period from April 26 to May 7 (.21 in.)

August 18; fertile fronds on several plants. The period July 14 to 26 had been dry (.10 in.).

Feb. 1, 1925; 16 fertile fronds on one plant, and many on other plants also. The period Dec. 23 to Jan. 4 had been dry, eight of these days being quite rainless, and a period of seven days having only .10 in. of rain. January was very wet, and on Feb. 10th a large number of new sterile fronds were seen unfolding. It is curious that the young sterile fronds are always pink (like the young leaves of many trees), whereas the young fertile fronds are green.

These observations are not very complete, but they appear to be of some interest. It is remarkable how little biological observation is recorded concerning the majority of our ferns; even information as to habitat is usually missing from systematic works. It is only the more remarkable species, such as the *Platycterium*, *Lecanopteris* and *Drynaria* which have received attention, but there is much of interest to be recorded about species less remarkable from a morphological standpoint.

3. *Gleichenia opposita* v.A.v.R.

In various places on the lower slopes of the hills of Pinang a peculiar *Gleichenia* is abundant. There are two old specimens in the Singapore Herbarium, collected by Curtis (no. 534, fertile) and Ridley (7037), and another has been added by the present writer (10286). It has recently been observed fairly abundant on the lower slopes of Kedah Peak, and was also collected at Semenyih in Selangor by H. L. Pume in 1922 (F. M. S. Museum no. 8327).

Mr. H. N. Ridley in his recent paper on the ferns of the Malay Peninsula (Journ. Malayan Branch, R. Asiatic Society, Vol. 4, p. 3) has described it as a new species, *G. parvifolia*. I find however that the type collection of *G. opposita* v.A.v.R. from Sumatra (which I have examined, by courtesy of the Curator of the Buitenzorg Herbarium) is identical, so that the latter name must be adopted (Bull. Jard. Bot. Buitenzorg, Series 2, XI, 13, 1913). The species is one of considerable interest, and as it appears to me that both the descriptions above mentioned are somewhat inadequate I have prepared the following notes on it. In dealing with the fronds of *G. linearis* and its allies with their manyfold forking (with or without development of the included buds) the usual terminology of pinna and pinnula becomes a little difficult to apply. For convenience I have here regarded each leaf as a branch system and have adopted the term pinna only for the ultimate leafy branchlets.

The main lateral branches of the fronds of this fern appear at first sight to be regularly bipinnate, with opposite pairs of pinnae, something like a form of *G. glauca* with the pinnulae (in the strict sense) opposite and widely spaced. A closer examination shows that a bud is present in the axil of one pinna of each pair,

on alternate sides of the rachis, and that the pinnae subtending these buds are larger than those opposite. The pinnae have exactly the same form as the ultimate branches of some forms of *G. linearis*: the pinnulae are closely set and densely ferruginous-hairy beneath, especially on the costulae. Comparing the branching of this fern with that of typical *G. linearis*, the homologies of the various parts are obvious. The axils where buds are present really represent forkings of the rachis, the forking being here unequal; one branch continues the growth of the branch-system, while the other is leafy like the ultimate branches of *G. linearis*. The opposite smaller "pinna" is one of the accessory branches usually present at the forkings of *G. linearis*, the other one being suppressed.

This condition of the apparent existence of two opposite pinnae is frequently found in the commonest of the smaller forms of *G. linearis* occurring in the Malay Peninsula. Fig. 1 shows diagrammatically the typical symmetrical branching of the common large form, fig. 2 a frequent type of branching in the small form just mentioned (which is very irregular) and fig. 3 the branching of *G. opposita*. In fig. 2 it is seen that at the penultimate forking the pseudopinnate condition occurs; it may also occur lower down the branch-system, though less frequently. Sometimes there is some development of the suppressed accessory branch, which may be represented merely by a rather long and slightly lobed pinnule.

On examining a number of complete fronds of *G. opposita* it is found that various irregularities in its branching may occur, and that these are all tending to the condition of the variety shown in fig. 2. The principal irregularities are as follows. Two of them are indicated in fig. 4.

(1). The suppressed accessory branch at any forking may be developed, either in a rudimentary form, or more rarely of normal size. These rudimentary accessory branches are common in other forms of *G. linearis*, as mentioned above.

(2). At any forking the smaller branch may be again forked instead of simple, with or without development of the extra accessory branch.

(3). The bud in any fork may develop, forming a short branch, forking once or twice again. At these subsidiary forkings small accessory branches may be developed.

(4). It not infrequently happens that the lowest bud on the lateral branch-system of a large frond develops into a strong axis, only slightly less in size than the main axis, bearing at its forkings lateral branch-systems exactly like those of the main axis, though somewhat smaller. In the branch systems of these subsidiary axes I have observed the same irregularities as those of the branch-systems of the main axis just described.

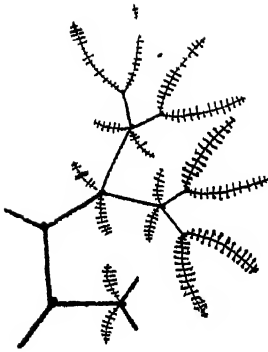


Fig. 1. Branching of normal *G. linearis*.

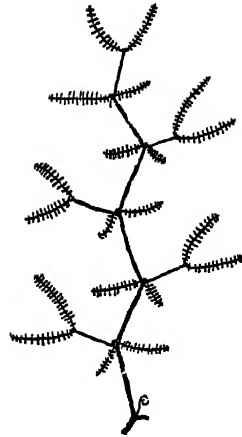


Fig. 2. Branching of a common form of *G. linearis*.

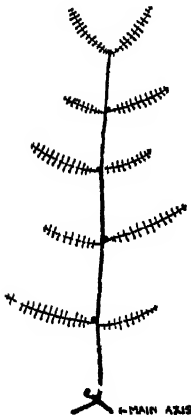


Fig. 3. Branching of *G. opposita*.

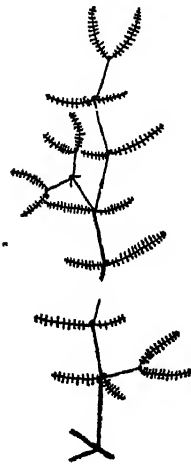


Fig. 4. Two abnormalities observed in *G. opposita*.

These irregularities all point to a close relationship with *G. linearis*; further, the fertile fronds show an arrangement of sporangia agreeing with *G. linearis*, 12 to 20 sporangia being present in each sorus.

4. *Syngamma borneensis* and *Lindsaya borneensis* in the Malay Peninsula.

On a recent visit to Gunung Pantii, in the south-east of Johore, I found *Syngamma borneensis* (Hk.) J. Sm. and *Lindsaya borneensis* Hk. quite abundant in the low forest on the top of the sharp ridge which forms the hill. The altitude is about 1500 feet above sea. *Syngamma borneensis* grew on the ground, and also in rock crevices. Most of the plants bore fertile fronds, which were decidedly longer and narrower than the sterile ones. The species has not previously been recorded from the Malay Peninsula, but two specimens from Mt. Ophir collected by Mr. Ridley (3331 and 9079) have been found in the Singapore Herbarium. Mr. Ridley, in his paper on the ferns of the Malay Peninsula (*Journ. Malayan Branch, R. Asiatic Soc.*, Vol. 4, p. 111) appears to refer these specimens to *Elaphoglossum melanostictum*, but they are evidently to be referred here, though they are large (fertile fronds to 60 cm. long).

Lindsaya borneensis is otherwise represented in the Singapore Herbarium only by two specimens from Singapore Island, though Beddome records it as collected by Scortechini in Perak. Mr. Ridley's 3062 from Taiping Hills and 12132 from G. Pulai, which he records as this species, have much larger leaflets and are to be referred to *L. lancea*; his specimen from the Talan River has not been found here.

5. *Syngamma Dayi*.

Syngamma Dayi Bedd. is a very small species first collected by Day, on quartz rocks "on the pass between Kuala Kangsar and Kinta, 2000 ft. alt." The exact position of this locality is a little doubtful. The species has now been collected again on Klang Gates (by H. L. Hume, F. M. S. Museums no. 7119). Klang Gates is a ridge of quartzite in Selangor, the highest point of which is about 1400 feet above sea level. On its upper slopes grow many interesting xerophytic plants, a list of which is given by Mr. H. N. Ridley in the F. M. S. Museums Journal, Vol. 10, pp. 247-251 (1922). Mr. Ridley also records *S. Dayi* from Kanching, Selangor, in his recent paper of the ferns of the Malay Peninsula.

6. *Lindsaya lancea* and *L. scandens*.

Lindsaya lancea (L.) is a species of wide distribution in the tropics of both the old world and the new, while *L. scandens* Hk.

is recorded as confined to the Malayan region. The distinction between the two is sharp enough if extreme forms be considered; the one terrestrial with compound fronds, the other climbing with simple fronds. But if a large series be examined, it becomes impossible to recognise a distinction between them, and I think that *L. scandens* is a habit-form of *L. luncea*.

Climbing plants may be found bearing unbranched leaves typical of *L. scandens*, and (on the same stem) branched leaves which cannot be distinguished from leaves borne by terrestrial plants with short creeping stems. The terrestrial plants may have fronds with few branches and large pinnules, or many branches and smaller pinnules, and no line can be drawn separating them. The pinnules may have a slightly recurved lower edge, especially if large, or a straight one, in both scandent and creeping forms. The stems of both forms have exactly the same type of stiff dark brown lanceolate scales; but it is to be noted that the scales of *L. repens* are quite similar, so that scales are not to be relied on as specific characters in this genus. The roots on climbing stems are short and serve partly to attach the stem to its support; they are densely covered with root hairs. The roots of terrestrial stems are longer and stouter, and usually have lost their hairs in herbarium specimens, but types more or less intermediate may be found.

van Alderwerelt van Rosenberg says of *L. luncea* in the Supplement to his Handbook of Malayan Ferns (p. 506): "Variable, with the rhizome varying from short creeping to wide scandent, the stipes stramineous to black or purple brown, the fronds to 50 cm. long, the branches abruptly shortly acuminate to subcaudate, the leaflets 1½-3½ cm. long, pale to dark when dry." Admitting so much variation, I cannot see that it is possible to separate *L. scandens* as a distinct species.

We have here an instance of the variability of many fern species; it is shown by several of the *Lindsayas*. The only real test proving the specific identity of the various form would be to grow plants from spores borne on one frond, and try to produce all the growth forms from the same parent. I do not think that any one has attempted this task, at any rate with Malayan ferns. It has many difficulties, the chief of which is to exclude foreign spores from the experiment.

7. *Polypodium triangulare* Scort.

Polypodium triangulare Scort. was first found in Perak, and described and figured by Beddome in the Journal of Botany, 1887, p. 324, t. 278. There are several specimens collected by Scortechini in the Singapore Herbarium, all without locality, and also specimens collected by Wray (294) at 4500 ft. on Gunong Batu Puteh, and Kunstler (Larut 3647). Subsequently it has been found on

G. Kerbau at about 6000 ft. (Haniff 14739) and on G. Tahan at 5500 ft. (Haniff and Nur. 7980). It appeared that the description of Copeland's *Acrosorus exaltata* from the Philippines (Philippine Journal of Science Vol. 1 Suppl. 158) agreed closely with *Polypodium triangulare*, and through the kindness of Mr. E. D. Merrill, lately Director of the Bureau of Science, Manila, I have been enabled to examine a specimen of Copeland's fern. The two appear to be quite identical, and therefore the Philippine plant should be called *P. triangulare*, or *Acrosorus triangularis*, if Copeland's genus be adopted. (See also Phil. Journ. Sci. 3 C, 347).

There are in the Singapore Herbarium specimens of *P. triangulare* collected at Khao Luang in Lower Siam (Dr. E. Smith 725) and on Mt. Kinabalu in British North Borneo (by Major C. M. Enriquez, 18163 in Singapore Series). The species has thus a wide range of distribution in the Malayan region.

8. *Gleichenia Norrisii*.

This species was described by Kuhn in 1869, apparently from specimens collected by Griffith and Norris some years earlier in the Malay Peninsula. It was figured by Beddome in the Supplement to his *Ferns of British India*, tab. 346. It is closely allied to *G. glauca*, and incomplete herbarium specimens are not always easy to distinguish. When seen in the field, the distinction between the two species is at once apparent. *G. Norrisii* has a looser habit, with more distant pinnulae and broader more rounded segments: the distal pinnulae are also conspicuously bent backwards. It further lacks the long deeply divided stipule-like leaflets that surround the apical buds of the fronds of *G. glauca*, these being replaced by pairs of reduced pinnulae close to the bases of the pinnae which form the fork containing the bud.

In ascending Government Hill, Penang, one first meets *G. Norrisii* at about 1700 feet altitude, where it largely replaces *G. linearis* as the common fern in open places beside the road. It occurs from this altitude upwards to the top of the hill (2500 feet), but towards the top and on the slightly higher Western Hill *G. glauca* appears and is more abundant. *G. Norrisii* has also been found on the Taiping Hills at about 2000 feet (Scortechini 439), on Bukit Panchor in Province Wellesley (Ridley 12634), on G. Angsi at about 2000 feet (Holtum 9901), and at the same height on the top of G. Pulai in Johore (Ridley 12127). *G. glauca* appears to occur at somewhat higher altitudes (to at least 4000 feet) throughout the Peninsula, and has been more frequently collected.

9. *Lygodium polystachyum*.

Lygodium polystachyum Wall. is by far the most beautiful member of its genus occurring in the Malay Peninsula. It has

rather a restricted range, of which the southern limit appears to be in Upper Perak, though a specimen has been collected by Mr. Ridley at Kuala Tembeling in Pahang. It occurs in Penang and the Langkawi Islands, and Curtis records that it is abundant all over the Island of Phuket in Lower Siam. Unlike the other species, it grows in the shade of the jungle, climbing up slender trees, and bears its fertile fronds in the shade. All the other local *Lygodiums* known to me are sun plants, or if they start life in the shade only flourish produce fertile pinnae in the open. The plants of *L. polystachyum* which have not yet produced climbing leaves have almost the appearance of a *Dryopteris*, and the basal pinnae of all fronds are very large. The texture also is much softer than in the other *Lygodiums*.

10. *Diplazium Ridleyi* (Copeland).

This species was described (as *Athyrium Ridleyi*) by Copeland in the Philippine Journal of Science, XI c, p. 39. The only distinction from *D. accedens* Bl. is in the presence of sterile areoles between adjacent rows of soriferous veins. Copeland also states that the rachis is smooth. The type collection, Ridley's 13970 from the Telom River, Pahang, is represented in the Singapore herbarium; with it is included a stipe which is covered with blunt spines. Probably no part of the stipe reached Copeland, as he does not mention it. Further, the upper pinnae and the distal portions of the lower ones lack the distinctive phenomenon of the sterile areoles separating the fertile veins. On comparison with other specimens from the Malay Peninsula it is seen that Ridley's Telom plant represents only an extreme form of a variable species. The following specimens all show the additional areoles at least at the bases of the pinnae, though none to such a marked extent as the type of *D. Ridleyi*: Burkill and Holttum 8730, Fraser Hill; Nur. 11082, Fraser Hill; Fox 10657, Maxwell's Hill; E. Smith 1924, Banang Sta, Patani. Considering the known variability of many species of *Diplazium*, it appears to me that these plants should all be reckoned as *D. accedens* Bl., or *D. proliferum* (Lam.) v. *accedens*.

I have lately seen at Buitenzorg, both in cultivation and in the herbarium, specimens of *D. permirabile* v.A.v.R. (*Bull. Jard. Bot. Buitenzorg*, Ser. 3, Vol. 5, p. 196), and it appears to me that these also should be included in the same species as the specimens above cited. The distinguishing feature of *D. permirabile* is the presence of scales at the apices of the spines on the stipes. The stipes of the herbarium specimens from the Peninsula above mentioned do not show these scales, but the blunt spines are exactly the same as in *D. permirabile*, and the absence of scales is to be ascribed to loss in the processes of drying and mounting. They are more easily lost than ordinary scales growing from the

surface of a stipe. There are plants from the Malay Peninsula in cultivation in the Singapore Gardens which bear scales exactly like those of *D. permaria*.

11. *Schizoloma Walkerae*.

Schizoloma Walkerae (Hk.) Kuhn has hitherto been collected in the Malay Peninsula only on Mt. Ophir (no altitude recorded) and in Singapore. Mr. Ridley says that it grows in watery places. An additional locality can now be added, in the north of the Peninsula; I found this fern growing on Kedah Peak at an altitude of about 3000 feet above sea, amongst Sphagnum, by a small stream in the low forest.

12. *Dryopteris paleata* Copel.

This species was found on a specimen from Benkoelen in Sumatra. It occurs also in the Malay Peninsula, the other collections having been confused with *D. ferox*, which it resembles only in the extreme scabiness of stipe and rachis. The specimens known from the Malay Peninsula are as follows:

Gunong Augsi (N. Sembilan) Holttum 9926, Nur s.n.; Bujong Malacca Ridley 9536; Penang, Ridley 7080, Curtis s.n.; Patani, E. Smith 1856.

The Peninsula specimens are somewhat more hairy than those I have seen from Sumatra. *D. persquamifera* v.A.v.R. from Celebes is closely allied.

13. *Polypodium insigne* Bl.

Beddome records this species from the Malay Peninsula, but cites no specimens; nor do any exist among the older collections represented in the Singapore Herbarium. Two specimens of Mr. Ridley's from Telom are however clearly referable to it: one is numbered 13978, the other unnumbered. They agree well with specimens from Sumatra and from Gunong Gedeh in Java, though somewhat thicker in texture than the latter. This species appears normally to grow on rocks in streams; Mr. Ridley's, 13978 is labelled "Telom River," and its appearance suggests a creeping habit.

Two specimens have been collected at Fraser Hill, by Miss G. Rose (no. 9, 1919) and by Burkill and Holttum (8189). The latter was climbing a small tree in the jungle, at about five feet from the ground, and its leaves are thicker in texture than the Telom plants, with narrower segments. These features are probably the consequence of restricted water supply in an unusual habitat.

14. *Hypolepis Brooksiae* v.A.v.R.

This species was described from Benkoelen in Sumatra (Bull. Jard. Bot. Buitenzorg, 2nd Series, XXVIII, 29, 1918), the writer remarking that it resembles *Dennstaedtia scandens* and *D. Moluccana*. It has been collected in the Malay Peninsula at Fraser Hill (Burkill and Holttum 8817, Holttum 11339) and Gunong Hijau (Haniff 9086) and is further represented in the Singapore Herbarium by a specimen from Brastagi in N. Sumatra (Holttum



The larger pond in the Dell, about 1917 (see plan No 3)

15435). Bonaparte has referred the specimen first quoted to *Dennstaedtia moluccana* Bl. (Notes Pteridologiques. Fasc. XIV, 55, 1923). I have recently compared the Peninsula specimens with the original in the Buitenzorg Herbarium and find that they agree exactly.

This species grows in tangled masses in open places, and is covered throughout with small thorns; it has apparently the same habit and almost exactly the same appearance as *Dennstaedtia moluccana*. It would be interesting to make a careful comparative study of these species. It seems likely that *Hypolepis Brooksiae* is derived from one of the scandent *Dennstaedtia*s by loss of the inner portion of the indusial cup, the outer part only remaining as a small growth at the base of the sinus below which the sorus is situated. In dried mature fronds it is impossible to detect any trace of the inner side of the cup, but in young fronds it might be found to exist.

It is interesting to observe that *Odontosoria aculata* (L.) from the West Indies appears to have a closely similar appearance and habit of growth.

15. ***Polypodium Féei*** (Boy) Mett. and ***P. heterocarpum*** (Bl.) Mett.

There is a common fern in the Malay Peninsula which has usually been called *P. Féei*. On comparing it with specimens of *P. Féei* from Java, and with descriptions, I have come to the conclusion that it should be called *P. heterocarpum*, and that the true *P. Féei* has not yet been found in the Malay Peninsula. The Peninsula fern is often small, the fronds frequently being only 7 to 10 cm. in length; the sori are much broken, rather distant, and distinctly embedded; the rhizome scales are very narrow, almost hair-like. *Polypodium Féei* from Java has usually larger fronds; the sori are much more regular, closer, and not immersed; the rhizome scales are broad. I have seen both plants in the field, and have examined a number of specimens of each in the herbaria at Buitenzorg and Singapore.

R. E. HOLTTUM.

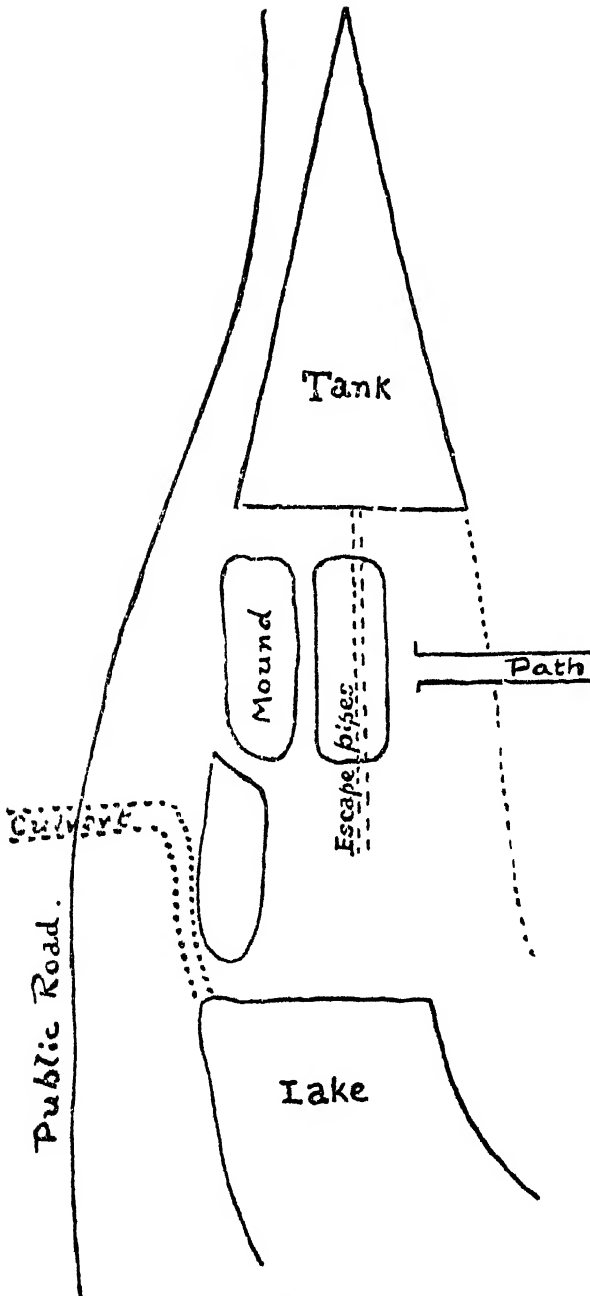
A Note Relating to the History of the Dell in the Gardens

The Botanic Gardens were founded in 1859. In that year the four and a half acres, now occupied by the Gardens Lake, made a swamp, down the middle of which ran the boundary between two properties—on the one side the Kerr property (newly sold to Hoo Ah Kay, better known by his trade name of Whampoa, and then acquired by Government for the Gardens) and on the other, the western side, the Napier property. On the Napier property stood the first house called Tyersal—a house which William Napier had built in 1854 and sold in 1857. When the house was sold the Tyersal property was broken up and went into several different hands, the house which the Temenggong of Johore

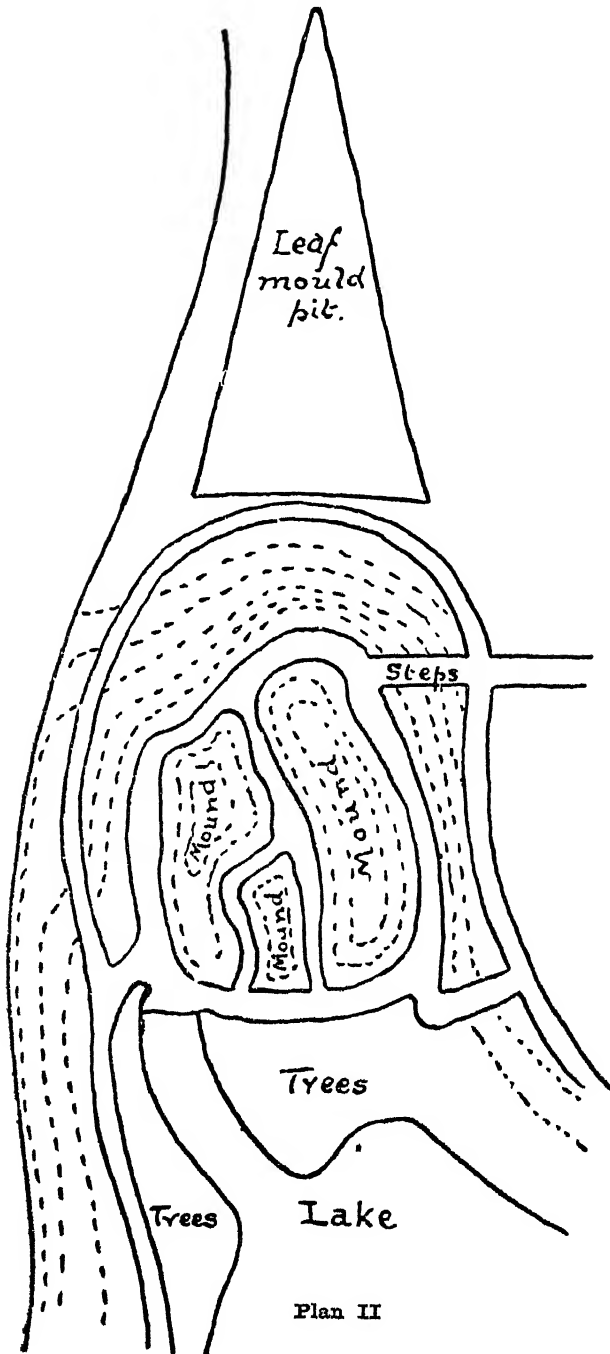
bought carrying with it a little more than sixty-six acres. The Temenggong sold his acquisition again in 1858, but repurchased it on May 23rd 1860. It was he who planted in 1862 the avenue of Tembusu trees (*Cyrtophyllum fragrans*) which leads to the house from Napier Road. In 1866 there were further deals in parts of the property, during which the Government acquired half of the Avenue together with the strip between the avenue and the swamp. The half of the avenue the Government converted into a public road, i.e. Garden road (now re-named Tyersal Avenue), and the narrow strip they made over to the Agri-horticultural Society for inclusion in the Gardens. The making of the Gardens Lake now became possible; and the Society by erecting a dam some eight feet high, created it.

Garden road is carried across the stream at the head of the Lake on an embankment over a culvert constructed of large rectangular pieces of granite. This culvert possesses a fall of slightly more than two feet in its length and is in section 3 feet 10 inches wide by 2 feet 7 inches high. At the time of its construction the Tyersal lakes did not exist; and, as shown by evidence obtained recently during the draining of them, their site was planted with coconut palms and mangosteens. What stood on the land thrown into the Gardens is quite unknown, as there is not a tree on the strip acquired by the Government, which can have been there in 1866; and there are no records. One may surmise that grass, and perhaps lallang, covered the ground. At the head of the lake, on account of the advantage of the inflow of water from the Tyersal grounds, the Gardens' cooly lines were placed; and a screen of kenari and pomelo trees was planted in front of them. Soon after this the Tyersal lakes were planned in imitation of the Gardens Lake, the imitation extending even to the islet. They were constructed just as the Gardens Lake had been, by deepening the hollow and steepening the banks, the earth from the bottom going in this case to construct a roadway all round the banks. In the extent of this roadway he departed from the model in the Gardens, for in the Gardens the raised road borders the lake only upon one side. The floor of the lower Tyersal lake was arranged to be on a level with the mouth of the Government's culvert, and a sluice was built to control the height of the water above it, whereby if necessary the lakes could be emptied approximately. Under the road along the lake side a culvert, small in section, made connection with the Government's culvert in a sump, and as the bottom of the lower lake was no higher than the entrance to the Government's culvert it was impossible to allow this small culvert to have any fall at all. Under what circumstances the complete emptying of the Lake was anticipated is not known: and there is no evidence that they were at any time emptied.

Emptying was apparently not contemplated in the case of the Gardens Lake, for no sluice existed, and no cutting on the embankment will even at this time completely empty it, as its bottom is still, after all these years of settling, below the level of the drain



Plan I



Plan II

along Napier Road: but there was made an unduly large brick escape channel, 1 foot high, $2\frac{1}{2}$ feet wide, domed and flat bottomed, which functioned for the escape of water till 1922. Only by breaking down its brickwork could this channel be made to carry off about five feet of water from the lake.

We can from these facts draw a picture of the appearance of the Dell, when Nathaniel Cantley in 1832 was appointed Superintendent of the Gardens. We see a gentle, and (except after rain) very small stream running from the Tversal into the head of the Garden Lake over a sandy bed in a hollow that had been embanked on one side, and with cooly lines upon the other.

Cantley, an excellent organiser, removed the lines to a place outside the Gardens limits, and thereupon considered to what use he could put the vacated site. Murlon, his predecessor, had failed in an attempt to make a fernery at a place close to the head of Maranta Avenue; and as Cantley, like Murlon, was anxious to succeed in such an undertaking, he sought for a new site and selected the dell. To succeed he wanted a more sure supply of water than the stream gave, and this is how he tried to meet the need. Having removed the cooly lines and having carried the water underground to the lake (it is by no means clear why), he constructed a triangular concreted tank, about 140 feet long, and at the base 65 feet broad, where it was six feet deep. Probably by means of the earth from the tank mounds for the ferns were then thrown up between the tank and the head of the lake, mounds not higher than that the water supply could be led on to them. But unfortunately the tank was not a success, for it could not be kept watertight: and what with illnesses and with other work Cantley never created the fern garden that he aimed at. It is to be assumed that the water was to reach the ferns by runnels along the tops of the mounds. For overflow, (as recent observations on the spot have shewn) he laid in the first place a line of gas piping to conduct the water from the tank, and then he constructed a much larger circular brick channel above it. These escapes passed in a straight line direct to the lake, and obviously did not water the mounds; other contrivances must have been thought of for that. But Cantley died with them unfinished. An old guide book indicates the Dell to have been then as in plan No. 1.

Because it was clear that these mounds could not function as their originator had contemplated, they were somewhat altered in shape by Mr. Ridley, and the tank was put to a new service, i.e. for the accumulation of leaf mould. The mounds were clothed with a variety of plants: and at the end of Mr. Ridley's service they were in shape as in plan no. 2 carrying palms and ferns and shade plants of various orders, and a few very interesting trees.

It will be observed that there were two circular paths enclosing the mounds: one of these was at the lowest elevation, and the other above it by six feet. These paths were narrow, and it was impossible in the morning to pass along them with comfort by

reason of the dew-laden foliage arching into them. Moreover the lower paths could not be kept free of mud. It was obvious that changes had to be made as soon as possible: and alterations were commenced in 1914 when by means of dredgings from the lake the lower paths were raised.

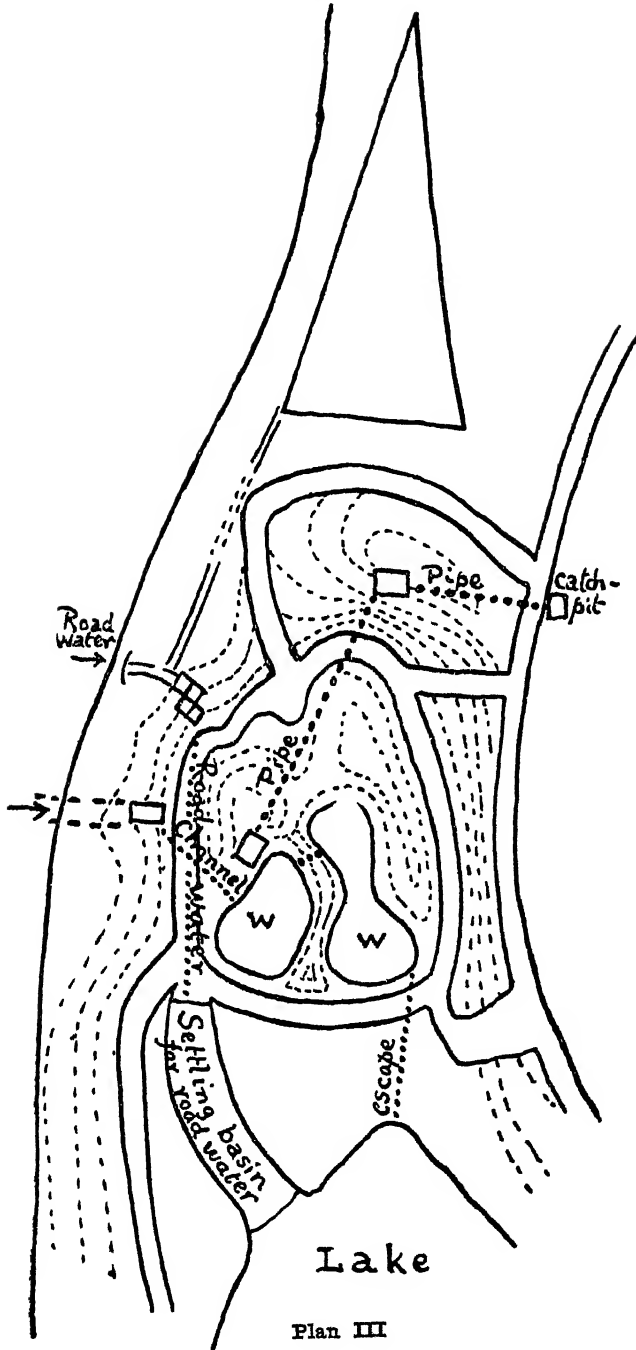
In 1915 the upper circular path was closed, and a new and much wider path with a greater diameter was made within the lower end of the cistern. This involved the erection of a mound along it to hide the leaf-mould pit. The drainage from the leaf mould was provided for at the same time by a channel behind a coral wall towards the public road. The silt off that road had been a source of annoyance in the garden for a long time, though the Municipality had done their best by steps and baffles in the road-side drain to abate it. The better to deal with it four catch pits were constructed in the Gardens where the road enters. The paths above the dell were changed likewise as the plan no. 3 indicates.

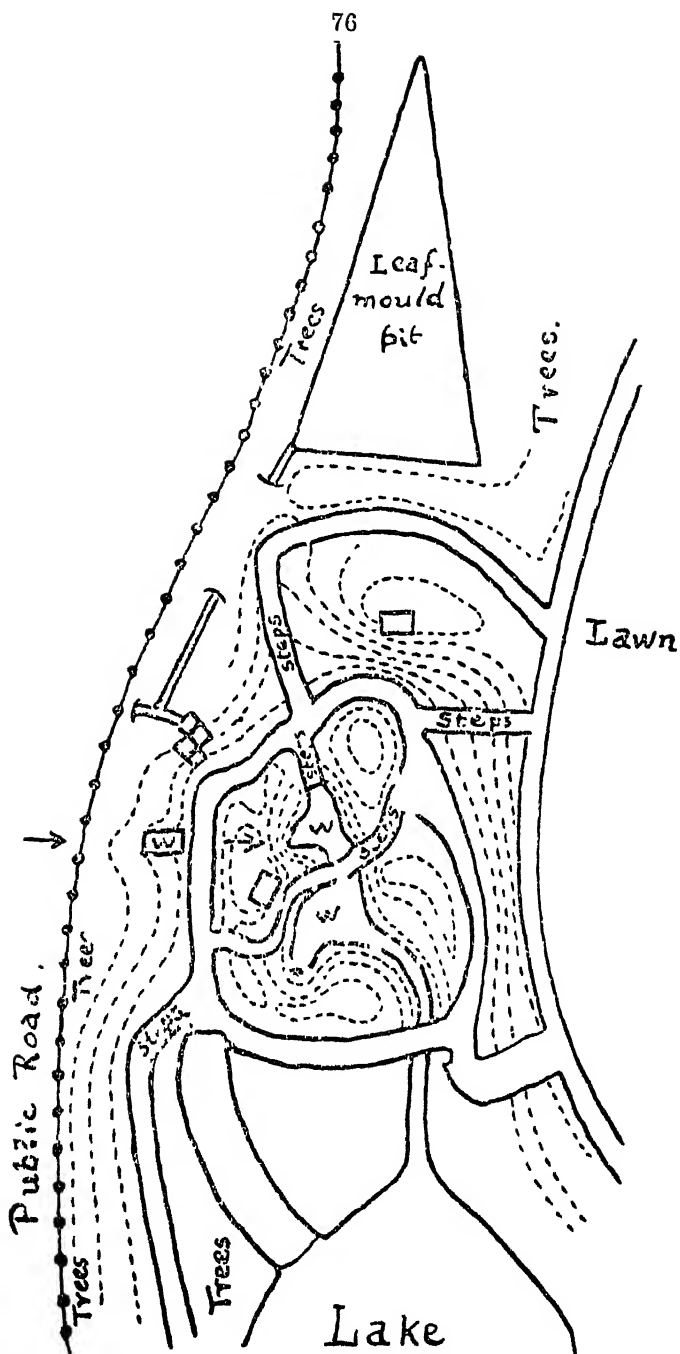
In 1916 the appearance of the dell were further improved by the creation of two pools in them, one oval and the other dumb-bell shaped: and those who saw them will remember that they were very pretty. Their surface was about 18 inches above the level of the water in the lake—a necessity to get the best appearance from the adjoining walks—which walks, as said, had been raised to keep them dry. One of these pools is shewn in the accompanying plate.

To maintain the water in the ponds two completely hidden bricks tanks were made, the lower supplied from the upper through an underground pipe and the upper receiving rain-water from a certain path-side drains towards the Bandstand Hill. Unfortunately the masonry of the upper tank gave way and undid the contrivance. But at that time it had been discovered in what way Cantley had dealt with the stream from Tyersal, and it was realised that by raising its level so that it filled the culvert and rose another few inches it could be fed into the ponds; accordingly it was so done by means of a simple concrete wall in Cantley's channel, and the bared end of the channel became the pretty rectangular pool at the side of the dell wherefrom the water passed underground into the oval pond, and through the dumb-bell shaped pond, while excess flood water still ran down Cantley's underground channel.

Permanence seemed to have been reached, and the dell had become very pretty.

Unfortunately the Tyersal ponds were found to be a source of mosquitos, and the emptying of them was determined upon. It was then quite unknown how deep the Tyersal lakes were: but a survey revealed that the lowest part of the bed of the lower pond was on a level with the bottom of the Tyersal sluice, and that





Plan IV

drainage without filling would be impossible unless a free escape of the water into the Gardens was allowed. This free escape was asked for: and it was a great disappointment to feel obliged to concede it, for concession meant the undoing of the water channels in the dell which had been so newly completed.

The concession was made on the ground that the Gardens had no claim to a head of water found to be due to the sluice in the Tyersal grounds being out of order. Thereupon a rearrangement of the dell was commenced, with the intention of keeping its features. In the rearrangement the beds of the two pools were sunk about two feet, united into one, and the Tyersal drainage water was conducted by an "Armco" pipe into the top of the former dumb-bell shaped pond, and out again by another "Armco" pipe into the lake. The sides of both ponds were concreted. By the lowering of the level and because of the wideness of the "Armco" pipe these ponds were thereby made into a part of the lake; and the abundant fish of the lake, which allow no mosquitos to mature, have access to them.

Now a great part of the beauty of the oval and dumb-bell ponds was that they lay open at the visitor's foot, not being sunk at all. The new pond however, being of necessity sunk, threatened to lack beauty in this respect. There was made therefore a path right across the dell bridging the water close against its surface and skirting the edge of what is left of the oval pond, in reality occupying part of the old bed of that pond, having on its north side the wall of one of the irrigating tanks of 1916. This wall is becoming beautiful by reason of a coating of *Ficus repens*.

The mounds, which now lie as in plan no. 4, are given severally to different forms of vegetation.

I. H. BURKILL.

Tulang Daing or Sisik Puyuh *Carallia suffruticosa*

Tulang daing means dried fish bones, and sisik puyuh means puyuh-fish skin: both these names belong to a small tree with serrations on the leaves that suggest the bones of a dried fish seen through the skin, which is exclusively used by the Malays of Perak and Pahang as a medicinal herb, but has hitherto remained rather strangely obscure. After much search it has been identified with *Carallia suffruticosa* Ridley (in Journ. Str. Br. Roy. As. Soc. 61, 1912, p. 6): and it is clear that *Carallia spinulosa* Ridley (in the same Journal, no. 82, 1920, p. 184) does not adequately differ.

The type of the first of these two names came from Dusun Tua, upon the east of Kuala Lumpur in Selangor; and that of the second from Tanjong Malim on the Selangor-Perak border. It extends southwards and has been found at Pulau Sebang in Malacca (Burkill 1960). As a medicinal herb, foliage has been got from Grik in northern Perak; and in Pahang from Budu in the Kuala Lipis district, from Beserah in the Kuantan district, and from Bentong. Mr. Ridley records *C. spinulosa* as occurring in Tonkin also.

The chief use that the Malays make of it is as a poultice for the ripening of boils: but it is also given internally under the idea that it is good for expelling worms, and as one of the innumerable herbs administered speculatively to women during the first three days after childbirth. It is again reported as one of several plants which at Grik are used in a decoction for a bath during fever.

The difference between *C. suffruticosa* and *C. spinulosa* is said to be in the inflorescence: but there is none: in both it is cymose. It was in flower and fruit at Tanjong Malim in February 1901, in bud at Dusun Tua in May 1896 and in flower at Pulau Sebang in August 1919.

I. H. BURKILL.

Teratological Notes

A.—Abnormalities in Coconut Palms.

I. Polyembryony. On p. 215 of this *Bulletin*, Vol. III, it was stated that the various references which had been consulted by me on the question of polyembryony in coconuts were not sufficiently clear as to make one to be quite positive about the occurrence of the phenomenon in coconuts. Cases, however, have come to my notice which prove beyond all doubt that polyembryony does occur in coconuts.

The ovary of coconuts, it will be remembered, is three-celled, two of which usually become abortive at an early stage of development, only one attaining maturity. The fruit consists of a thin outer skin or *epicarp*, below which is the thick fibrous *mesocarp* surrounding the hard shell or the stony layer of the nut. This shell is formed mainly of the *endocarp*, but the outer integument of the seed is also represented in it as a lignified inner lining of the shell (fide Juliano)¹. Inside this stony layer is the solid

1. Juliano, J. B.—Origin, Development, and Nature of the Stony Layer of the Coconut (*Cocos nucifera* L.). *Philippine Journ. Sci.*, XXX (1926), p. 187-200, pl. 3.

Winton, A.L.—Anatomy of the Fruit of *Cocos nucifera*. *Am. Journ. Sci.*, XII (1901), 265-280. Quoted by J. B. Juliano.

endosperm which is the kernel or "meat" in common parlance and which is lined outside by a thin blackish coating. This coating—we may as well call it "testa"—is derived from the inner integument of the ovule (Juliano¹). Then comes the cavity partially filled with water or "milk" (watery endosperm) in ripe coconuts. Corresponding to the three carpels of the ovary, there are three markings or "eyes" on the endocarp, two of which have become hard after the degeneration of the two cells of the ovary, while the third "eye" of the developed cell is soft. Just beneath this "eye" is the embryo. When the germination sets in, a suckorial organ—*haustorium* or "foot"—develops into the cavity, at the end of the cotyledon of the embryo, which supplies nutriment to the young growing plant by absorbing it from the endosperm.

Bearing these points in mind, it will be easy to study the nature of the phenomena concerned in the cases described below:—

(a).—On July 25th, 1925, there was exhibited at the Taiping Agri-Horticultural Show, a germinating coconut from Kampong Jelutong, Bukit Gantang, North Perak, which had put forth three shoots. The coconut was carefully husked by me to find the three shoots as distinct individuals as far as the soft "eye" through which they had extruded from the endocarp. The two other "eyes" were closed and hard as in an ordinary nut where two carpels are abortive. On breaking the nut open, it was observed that each shoot had its origin in a separate embryo, each having a cotyledon and a haustorium of its own. There was only one cavity in the endosperm into which these three haustoria had developed, and there were neither hard, nor leathery dissepiments in it which are said to be present in a polycellular nut.² The kernel inside also showed no signs of any special connection with the closed "eyes" as it showed with the soft "eye." This is then a genuine case of polyembryony in coconuts.

I have also examined many such specimens having two to three embryos from Singapore, Selangor, Penang and Malacca which go to prove that polyembryony does frequently occur in this country. These shoots may emerge out of the husk in all directions, and often in suchwise as to mislead one to think that these extra shoots are due to the functioning of more than one ovule. Hence I look with great suspicion on all the three cases mentioned from Philippines by Quisumbing³ as ones where more than one ovule were functional.

¹ 2. Furtado, C. X.—Branched Coconut Palms and their Fertility. *Gardens' Bull.*, Singapore, Vol. III (1924), p. 274.

³ 3. Quisumbing, E.—Branching in Coconut. *Philippines Agriculturist*, XV (1926), p. 3-4.

I have not yet come across in this country a genuine case where more than one ovule had developed giving rise to di-, tri-, or polylocular nut, though such cases have been reported from elsewhere.^{3 4 5}

(b).—Costerus and Smith (1923)⁵ describe a case of polyembryony in thus:—

“Legit II. A. B. Bunнемeyer, Isle of Nangka near Banka, 1917. One celled nut. From one of the black (germinating) spots there emerged four sprouts each showing its own cotyle. No question of branching. Consequently we have here to do with a true case of polyembryony.

“Mr. Smith is thoroughly convinced that the Coconut with three cohering stems, which we described in 1915, is after all a similar case of polyembryony with this difference only that the embryos of 1915 coalesced whereas in the present case they have maintained their full independence.”

The coconut referred to as having been described in 1915 is one which had given rise to three sprouts and which on being carefully opened had not shown any dissepiment whatsoever. “Only one germinating plant forcing its way through one of the black spots was to be seen, but the stem of this young plant showed a separation into three. The advanced state of (dry) specimen did not permit of a further examination into the cause of the phenomenon, but of polyembryony there can be no question.” No further details or reasons are given why Dr. Smith thinks this to be a genuine case of polyembryony and not of fasciation or branching.

(c).—In the Botanic Garden, Penang, there is a “coconut palm” which has three distinct individual stems from the base. Mr. Mohamed Elshiff who has been long connected with the garden, informs me that the three stems have originated from one coconut fruit and that it was planted there in 1901. Only two stems are bearing fruits, while the third one is yet barren and is also very much shorter than the other two. The small growth of this third stem is in all probability due to the fact that twice during its growth it was very badly attacked by borers (there are still marks on the palm of these attacks). The injury caused by the attacks must have retarded the growth very considerably, giving thereby the other two stems a chance to overshadow this one and to make its further development and production of flowers rather difficult. The overshadowing caused by another palm growing close to it may be an additional cause why this stem is weak and infertile. There is another similar palm with two fertile, and

4. Costerus, J. C. and J. J. Smith.—Studies in Tropical Teratology. *Annales Jard. Bot. Buitenzorg*, XXIX (1915), p. 84-85, and plates.

5. Ibid ibid —ibid XXXII (1923), p. 26 and plates.

one barren, stems in the Botanic Gardens Cooly Lines, Penang, which have originated (*vide* Mr. Haniff) also from one nut. The short and barren stem shows signs of injury in the past. In a private compound at Burma Road, Pulau Tikus, Penang, there is a tree about forty years old which has two stems, distinct from the base, both of which are producing fruits.

II. The Development of the Usually Abortive Ovary in Male Flowers. A coconut spadix was exhibited at the Taiping Show, 1925, which had numerous banana-like fruits and only two nuts of normal shape. The latter were borne in the regions of the spadix where normally female flowers are produced, while the former occupied the positions of male flowers. Apparently this is a case similar to the one quoted on page 263 of this *Bulletin*, III, the banana-like fruits being the result of the development of the usually abortive ovary in male flowers.

III. Albino Coconut Seedlings. In the Taiping Show, 1925, there were exhibited two coconut fruits which had put forth completely albino shoots. The albinism was apparently due to some internal factor, and may be a case of chlorosis due to lack of ferruginous products in the endosperm. It could not be attributed to the lack of light as the plants received ample sunlight at the show (and they must have been exposed during the transit), and because normally coconut seedlings germinated in darkness such as obtained in a closed house, have greenish leaves. Neither nut had put forth any roots out of the husk. From the shape, size and colour, the nuts appeared to have come from the same spadix. Further investigations on these nuts were not possible as they were not for sale.

IV. Suppression of Spikelets in Coconut Spadices. Ordinarily a coconut inflorescence consists of many flower-bearing spikelets produced on a fleshy stalk, which usually does not bear any flowers. At the Agri-Horticultural Shows of Taiping and of Kuala Lumpur, 1925, inflorescences were exhibited which were abnormal in that the axes were unbranched, the flowers being borne directly on them.

The flower-bearing region of one such specimen from Taiping measured three feet and four inches, while the non-flowering portion towards the tip was nearly six inches long, and towards the base over eight inches. The bearing portion of the stalk was occupied by female flowers which were more than a hundred in number. In the basal portion, the flowers were arranged in pairs, each pair being some distance apart from the other, and their arrangement resembled that of the male florets on the spikelets of normal inflorescences. The space between these pairs of flowers gradually decreased towards the end so that in the upper third of the bearing stalk the female flowers were so thickly crowded together that they did not admit any special relation between any two consecutive

flowers. On many of the cushions on which the pairs of female flowers were seated, there were two male florets, one on each side of the pair, while in the upper portion where the flowers were very close to each other one could notice occasionally one male floret between two consecutive female flowers. All the male flowers present at the time of examining the inflorescence had shed their pollen and were quite dry. Many of them dropped down with a slight shake, leaving behind no clear marks or scars to show that they were present there. Like normal flowers, they (male flowers) had six segments in perianth, six stamens and a vestigial ovary.

All the female flowers examined were morphologically normal, except that the papery yellow ring which is usually found around the base of the ovary was occasionally adorned with teeth varying from one to six in number. (For the morphological value of this ring see note on Horned Coconuts). The development of these flowers was acropetal so that the youngest flowers were found at the terminal end. Though many of the flowers towards the basal end had their stigmatic portion out of the perianth envelope, not a single one of them was ripe to receive pollen. This therefore means that any nut developed on such inflorescences would be a result of cross-pollination, unless of course they are fertilised by the pollen from another inflorescence on the same tree or by pollen from the same inflorescence which had retained its vitality till the female flowers had become ready to receive it. That similar inflorescences are not infertile was proved by two other such inflorescences, one at Taiping and the other in Kuala Lumpur. The Taiping specimen had three well-developed nuts and the Kuala Lumpur one had five, in their distal end.

Owing to the advance stages of all such inflorescences examined no further details could be gathered as to the exact relation of the male to female flowers, or as to the nature of the phenomenon concerned in the monstrosity.

I was told in Taiping that the palms which produce these monstrous inflorescences have the habit of producing such monstrosities many times during the course of a year. If so, it would be worth while to keep the palms under observation so as to study how these inflorescences originate, what exactly is the composition and nature of the spathes enveloping them, of young flowers, etc. Such a study may help to throw light as the cause and the nature of the phenomenon involved.

Costerus and Smith⁶ who have had a better opportunity of studying such specimens record that all the female flowers in such inflorescences they examined were paired, each female flower being

6. Costerus and Smith.—Ann. Jard. Bot., Buitenzorg, XXXII (1923), p. 24-25 and plates.

flanked by two male florets, but that these male florets soon perished. Similar inflorescences having a side branch have occasionally come to their notice.

V. Horned Coconuts. At the Malacca Agri-Horticultural Show, 1926, three "horned" coconuts (*kelapa tandok*) were shown, each having a horn in appearance similar to the husk. This horn measured five inches in length, and one and one-fourth inches thick in the central portion. It had two small lobes one on each side of the principal one which was large and thick. A copious exudation of gum was found on the inner side of the horn (the side towards the nut), and where there was gummy exudation, the epidermis of the horn seemed to be much affected though the epidermal tissue of the nut appeared to be quite intact. The perianth was then carefully removed from the nut and it was found that this horn was due to the abnormal development of the one side of the papery ring that is usually found between the perianth and the nut, the growth of the other half of the ring having become arrested at an earlier stage, so that it was not visible when the perianth was still attached to the nut. This portion of the ring also had one principal central lobe which measured about one centimeter from the tip of the base, and two small slightly developed ones, and it resembled the perianth in texture. At the tip of the central lobe abundant exudation of gum was noticed. The thalamus had also grown out a little more than usual, especially on the side of the horn, so that the horn could be mistaken for a basal outgrowth of the nut. The horn when cut open was found to be full of fibrous tissue only, like that of the husk, while the nut itself was normal and had all its three "eyes" as usual. The perianth consisted of six normal segments. Hence the view put forward by Masters⁷ that these horns are due to the hypertrophy of the perianth segments is untenable.

Petch (1924)⁸ describes similar cases of horned coconuts and mentions that the horns may vary in number from six downwards and that they sometimes coalesce in pairs, or two or three may unite by their tips. Some of these horns may be fringed by a thin wing, resembling in texture the segments of the perianth. In all such cases examined by him perianth segments were also present and were normal.

Costerus and Smith⁹ figure somewhat similar cases in the *Buitenzorg Annales* which they consider to be instances of

7. Masters, M. T.—*Vegetable Teratology* (1869), pp. 428-429).

8. Petch, T.—Horned Coconut. *Year-Book Dept. of Agric., Ceylon*, (1924), p. 20-21.

9. Costerus, J. C. and J. J. Smith.—*Studies in Tropical Teratology. Annales Jard. Buitenzorg*, XXXIII (1923), p. 95 and fig. 23.

apocarpv, but in the absence of a detailed description, those cases cannot be compared with the above described ones.

Petch seems to favour the view that the horns are due to a duplication of the segments of the gynaeceium. But I am inclined to adopt his less favoured view that the horns represent the six stamens. The following will make clear the position of my view:

Examining flowers of coconut, one usually finds in the male, six perianth segments surrounding six stamens inside and a rudimentary pistil in the centre, and in the female, six perianth segments, a fertile pistil in the centre, and a papery ring between the base of the pistil and the inner perianth segments; that is, the papery ring occupies the place of the androecium in the male flower. May not then this papery ring in the female flowers represent the androecium which in the course of evolution has been reduced to this vestigial state? The fact that this papery ring is invariably present in the female flower, and a vestigial ovary is the male flower, and that the ring is a growth quite distinct from the perianth and the ovary, lends support to this view. And from the examination of the horned nuts exhibited at the Malacca Show, it was quite evident that the horns were due to the development of portions of the ring.

Gadd (1924)¹⁰ describes abnormal female flowers of coconut where three carpels were fused only at the base, being free to a greater or less extent at the apex. "Between the perianth and the gynaeceium was a ring of six papillae, in a position which stamens would be expected to occupy, if present." These flowers seem to represent a somewhat earlier stage in the evolution of the female flower of coconut.

Recent histological studies made by Julian¹¹ regarding the ontogenetical development of the female coconut flower from an additional evidence in favour of the view that the papery ring is a modified androecium. He shows by means of microtome sections that the development of the floral structures is acropetal, that is, the outer two prophylls are first differentiated from the primordium, then the sepals and the petals follow in succession. The ring which he calls "aril" arises just after the formation of the petals but much before the primordium has differentiated into an ovary and carpels. Hence therefore the ring or the horns cannot be an outcome of the multiplication of the carpels.

10. Gadd, C. H.—An Abnormal Inflorescence from a Nut. *Year Book, Dept. of Agric., Ceylon*, (1924), p. 21-23.

11. Julian, J. B.—Origin, Development, and Nature of the Stony Layer of the Coconut. *Philipp. Journ. Sci.*, XXX (1926), p. 187-200 and pl. 1-3.

B.—*Ananas sativa*.

It is not uncommon to see various forms of monstrosities in the fruits (soroses) of pine-apples (*Ananas sativa*). Hitherto I have been the following abnormal forms in this Peninsula:—

I. Fasciation. One of such monstrous pine-apple fruits had cylindrical base about two inches long and was much stouter than the average fruits of the same variety. The fruit then showed a tendency to taper in one axis and expand in the other. The expansion had occurred to such an enormous extent that it had given rise to several twistings and bendings. Measurements with a tape would indicate that the topmost part of the fruit had become more than two feet in breadth, while its thickness had been reduced to about an inch or a little more. The foliose shoot that usually crowns a pine-apple fruit had also fasciated apace with the fruit. Its vertical axis had become abbreviated to a very considerable extent and the leaves were reduced to mere scales, about an inch and half in length and half an inch in breadth, so that the expanded apex of the fruit appeared as if fringed with these scaly leaves. This form appears to be very rare in pine-apples.

Another form of fasciation that is more commonly met with in pine-apples is one which differs from the former in that the fruit in the latter flattens to a less extent and produces many cylindrical heads, each with a normal or reduced crown of its own. I have seen pine-apples with three, five and seven heads.

The third kind of fasciation affects the crown of the fruits only. In one such specimen the leafy crown had trifurcated, the fruit itself remaining normal. That these three shoots were due to fasciation of the main axis and not to the proliferation of the two axillary shoots was easy to be seen as the leaves were reduced to small scales and the lower portion of the stalk had become very much thicker.

Fasciation showing various grades of these three cases have been also observed.

II. Proliferation. On the stalk bearing the three-headed fasciated fruit described above, there were many, much proliferated, vegetative shoots arising from the axils of the bracts. They had grown as long as the fruit itself, and were present only in the upper portion of the stalk, close to the base of the fruit, lower portion of the stalk bearing no such shoots.

In another specimen there was a similar proliferation of shoots in the axils of bracts close to the fruit, but these shoots were re-productive so that they produced many banana-like, elongated fruits at the base of the main fruit.

Sometimes axillary shoots on the base of the leafy crown of the pine-apple fruit grow very vigorously, even much faster than the main shoot itself.

Proliferation of vegetative shoots on the stalk or on the crown of the fruit is very common, almost a "normal" phenomenon in pine-apples. Production of fruits at the base of the principal fruit has been noticed by me only twice in this country.

C. X. FURTADO.

***Dioscorea tamarisciflora*, Pr. and Burk.**

In September, 1890, Mr. Charles Curtis collected in the Langkawi islands a *Dioscorea* with male flowers, which was described in 1914 under the above name in the Journal of the Asiatic Society of Bengal, N. S., 10, p. 22, and until recently it has remained known only by his specimens. But in the early part of 1924, two collectors, Mohamed Nur and Kiah, were sent from the Botanic Gardens, Singapore, to the mountain of Gunong Pulai in the south-western part of the State of Johore, whence they brought back living tubers of the same plant; and these gave upon cultivation in the Gardens, both male and female plants. It is possible therefore to add to what is already known about it.

The tubers are black, densely covered with short roots, sparingly branched, the branches more or less cylindrical. They form at the surface of the soil and descend for 20 to 30 cm. It would seem by their appearance and surface growth as if they may be altogether unappetising to the hungriest of wild pigs, the chief destroyers of edible forest tubers. The plate given here well illustrates them.

The stems towards the base and also above carry sparingly small prickles. They attain the thickness of a crow-quill, and climb over any convenient support to 2 or 3 metres.

The upper leaves have been described. The lower are similarly ternate and scarcely differ. All leaflets are relatively small, the middle attaining little more than 5 cm. by 1.75 cm.

The male flowers have also been described. They were produced in Singapore in the greatest abundance.

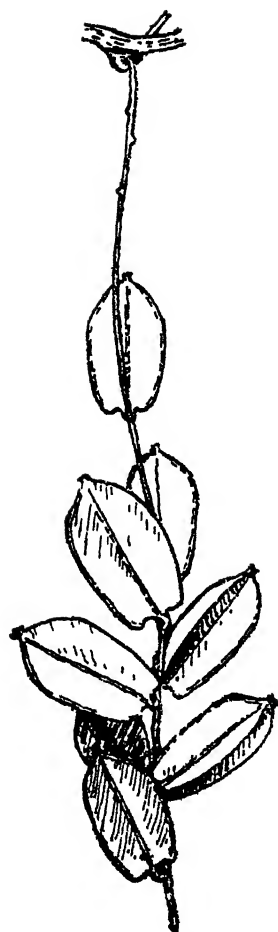
The female flowers were more sparingly developed. They offered nothing that is not seen in the closely allied species of *Dioscorea*, section *Lasiophyton*.

The capsules resemble those of *D. pentaphylla*: but are slightly more acute, as the accompanying line block shews.

From the Langkawi islands to Gunong Pulai in a straight line it is about 450 miles, i.e. almost the whole length of British Malaya; and the species may occur sporadically throughout the Peninsula. It has been already found in one other place, namely



Dioscorea tamarisciflora Pr and Burck



A fruiting spike of *Dioscorea tamarisciflora*, together with outlines of five capsules:—no. 1 an unusually rounded capsule of *D. tamarisciflora*, and no. 2, a normal capsule: nos. 3, 4 and 5, capsules of *D. pentaphylla* from various places in India, thus, no. 3 from the Khasya Hills (Hooker and Thomson), no. 4 from Hoshangabad in the Central Provinces (Duthie, 10578) and no. 5 from Behar (Hooker). All nat. size.

on rocks near a village named Pulau (from the *Alstonia* tree, like the mountain) in southern Kelantan close to the Pahang boundary (Mohamed Nur, 11944). It has not been met with outside the Peninsula.

D. FRAYN.

I. H. BUNKILL.

A List of Mosses Collected in the Botanic Gardens, Singapore.

In the previous issue of the Gardens' Bulletin appears a list of all mosses hitherto collected in the Malay Peninsula, prepared by Mr. H. N. Dixon, who has himself determined the majority of the specimens concerned. Our best thanks are due to Mr. Dixon for the very great amount of work which he has put into the preparation of this paper. Before receiving Mr. Dixon's list, I had compiled a list of mosses found in the Singapore Gardens, with such first-hand observations as I had been able to make concerning their habits of growth, as it seemed that few observations of the kind had been recorded. This list is here printed as a supplement to Mr. Dixon's paper. It contains no references to collectors or numbers (these can be found in the complete list) but only names of species and such information as to habit and habitat as I have found on herbarium labels or collected myself. Not having made a critical study of mosses, in many cases I can only speak of the habitats of individual specimens collected by me and identified by Mr. Dixon, but there are a few common species which it is easy to recognise at sight, and of these it is possible to speak with greater certainty.

The Gardens present a fairly wide range of habitat for mosses, from the most exposed positions on the ground or on trees to the shade of the rockeries and the Gardens Jungle; but there is no place so moist and shady as much of the natural jungle of the Peninsula. The conditions are on the whole artificial, and this is reflected in the character of the moss flora; the more typical forest species are infrequent or absent.

A striking feature of the list, referred to by Mr. Dixon in the introduction to his paper, is the large proportion of species of *Syrrhopodon* and *Calymperes*; this is more marked in Singapore than in the north of the Peninsula. In Singapore Island 32 species of the two genera have been found, out of 51 for the whole Peninsula; from the north fewer are recorded, 16 only having been found in Penang (mostly in the Waterfall Gardens or on the hill) which after Singapore is probably the most-collected area. In recent collections I have paid particular attention to these genera, and in searching Penang Gardens it was with difficulty that they could

he found, whereas in Singapore they occur on tree trunks in any slightly shaded spot. It is possible that the more seasonal climate of Penang and the north of the Peninsula is not so favourable for these mosses; in Penang a pronounced dry season early in the year is the rule. They are not usually found in dense shade, but in light shade, on tree trunks, and sometimes on rocks or on the ground (according to the species and the conditions). They do not usually grow in full sunlight, except some of the more resistant species, (e.g. *S. borneense*; this grows in a close cushion which can retain moisture). During rather dry weather they are often much shrivelled up. It is perhaps their habit of growing in somewhat exposed places, together with inability to withstand severe drought, which causes their restriction, on the whole, to places with a fairly heavy and evenly distributed rainfall, or a continuously high atmospheric humidity.

***Microdus miquelianus* (Mont.) Besch.**

On ground in the open.

***Campylopus serratus* Lac.**

Very abundant. It grows on the ground, frequently on the lawns where the grass is poor, in the open, or more usually in moderate shade; sometimes in a close pure growth. It is usually sterile; I have found male plants with antheridia, but not ripe fruits.

***Leucobryum sanctum* (Brid.) Hpe.**

Very abundant locally. It grows on the ground, requiring more shade than *Campylopus serratus*, and often forms large pure patches under trees, or mixed with *Campylopus* and such grasses as will tolerate a little shade. It may also grow on the bases of trees to some extent. No fructifications seen.

***Leucophanes octoblepharoides* Brid.**

***L. albescens* C. M.**

Leucophanes spp. usually grow on tree or palm trunks in masses, rather in the same positions as *Syrrhopodon* spp. They may also grow on the ground in moderate shade.

***Fissidens mittenii* Par.**

Found on bare ground under the shade of a *Phoenix sylvestris*.

***F. crassinervis* Lac.**

Mr. Ridley has collected this species in the gardens. I have found it in the Reservoir jungle on the ground by pathsides in shady places rather abundantly, though not forming dense masses like the next species.

F. zippelianus D. & M.

Very abundant on brick drains and on rocks in shady places, also on hard ground (stiff clay) in the shade. It forms a dense continuous mat, and has not yet been observed bearing sporogonia. It avoids the mortar between the bricks of the drain (this is sometimes covered with a hypnoid moss) and, appears to avoid the coral in the rockeries.

Syrrhopodon ciliatus Schw.

Found on trunks of sago palms in shady places, forming a close mat, sometimes freely fruiting.

S. fasciculatus Hk. & Grev.

On the ground beneath an old *Artocarpus rigida*, and on the base of its trunk, shaded also by fronds of *Davallia*, growing about the tree.

S. involutus Schw.**S. flavus** C. M.

On a dead tree trunk in the Gardens Jungle, abundant.

S. manni C. M., f. *minor* Fl.

On tree trunks in Gardens Jungle, creeping. Apparently a common species in Singapore, but always the f. *minor*.

S. repens Harv. Apparently a common species in Singapore.**S. revolutus** D. & M.

On a *Sabal* trunk, underneath epiphytic ferns (*Asplenium nidus*) in thick rounded cushions. The fern roots with their accumulated debris are like huge sponges, and water flows down from them for some time after rain has ceased. The tufts of *Syrrhopodon* are also sponge-like and can hold much water. Apparently the same species occurs on the trunk of a big *Lycium costulata*, where also it is shaded and has ferns above it.

S. rufescens Hk.

Collected several times in Singapore by Mr. Ridley. Probably grows on tree trunks, but the only definite habitat note is its occurrence on the mass of roots of an old *Platynerium*. This is similar to the habitat described for the last species.

Calymperes dozyanum Mitt.

On a raised root of *Albizia* sp., in a rather shady spot.

C. hampei D. & M.

On roots and ground in shade.

C. nicobarense Hpe.

Collected by Mr. Ridley in the Economic Garden. Apparently a common species in Singapore; otherwise only known from Langkawi and the Nicobar Islands.

C. salakense Besch.

Collected in the Gardens once, by Mr. Ridley.

C. serratum A. Br.

Obtained by Mr. Ridley either in the Gardens or on Bukit Timah; exact locality uncertain.

Barbula indica Brid.

Grows in thick cushions, in rather exposed places. It is the commonest moss on open brick drains, and does not avoid the mortar. It will grow also in moderate shade, in which case it may be found side by side with *Fissidens cippelianus*.

Macromitrium goniorrhynchum D. & M.**Bryum coronatum** Swaegr.

On rocks in rather exposed places (sun rockery) and on the ground; found also on rocks in moderate shade. It grows both on coral and other rocks. In dry weather it is quite shrivelled up, but during wet periods soon forms thick green cushions, which later bear abundant fruits.

Myurium rufescens (Hornsch. and Rrw.) Fleisch.**Callicostella prabaktiana** (C. M.) Jaeg.**Pelekium velatum** Mitt.

On coral in shady rockeries, abundant. This is the only record from Singapore; in other parts of the Peninsula it is usually found on limestone.

Ectropothecium buitenzorgii (Bel.) Jaeg.**E. monumentorum** (Dub.) Jaeg.**E. moritzii** (C. M.) Jaeg.

Very abundant (though possibly mixed with other species). It often forms a close carpet on the ground in shady places, and on the bases of tree trunks; also to some extent among grass.

E. singaporense Dixon.

Collected once only, "on grass in open" (Binstead).

E. zollingeri (Bry. jav.) Jaeg.

In tank in plant house, fruiting only when left dry (Burkill).

Trismegistia lancifolia (Harv.) Broth.**Isopterygium albescens** (Schw.) Jaeg.

On the ground in a shady place. Found also by Binstead on a palm.

I. minutirameum (C. M.) Jaeg.

Plagiothecium miquellii (Bry. jav.) Broth.

This is a very common moss in the Peninsula, usually on old logs in shady places, but also occurring on the ground.

Taxithelium isocladum (Bry. jav.) Ren. & Card.

T. instratum (Brid.) Broth.

T. nepalense (Harv.) Jaeg.

Vesicularia dubyana (C. M.) Broth.

V. montagnei (Bel.) Broth.

V. reticulata (C. M.) Broth.

Meiothecium microcarpum (Harv.) Mitt.

Occurs on palm trunks and elsewhere in more exposed positions than most hypnoid mosses, often with algae of the genus *Trentepohlia*.

Rhaphidostegium caespitosum (Sw.) Jaeg.

Trichostelium Boschii (D. & M.) Jaeg.

T. brachypelma (C. M.) Broth.

T. singaporense Fleisch.

The hypnoid mosses are so alike in habit and are so abundant that I cannot distinguish any of them in the field with certainty, and cannot make any definite statement about the habitat of most of them. They are usually found on tree trunks, on logs or on the ground, in rather shady places.

Hypnodendron arborescens (Mitt.) Lindb.

Small specimens, collected in the Gardens Jungle by Mr. Ridley.

R. E. HOLTUM.

Additions to the List of Fraser Hill Plants.

This list is intended to supplement the enumeration of Fraser Hill plants published by Burkill and Holttum in this Bulletin, Vol. III, pp. 33—110.

The material from which it is compiled was obtained by a native collector working under the writer's supervision in August 1923, and by Mr. R. E. Holttum in the following month.

A few plants from the collections of Messrs. Burkill and Holttum have been added, where these have been determined since the publication of the original list.

All the plants, except where otherwise noted, were collected between the 3800 and 4200 feet contours.

SCHIZANDRACEAE.

Kadsura cauliflora, *Bl.* A big liane of Sumatra and Java; in the Peninsula Penang, Perak, Singapore, usually at low altitudes. (11197).

Kadsura lanceolata, *King.* A woody climber, endemic, Taiping Hills at low altitudes. (11266 at 4800 ft.).

ANONACEAE.

Artabotrys venustus, *King.* A big liane of Siam; in the Peninsula Taiping Hills and Gopeng, Perak. (11316).

Polyalthia sp. No flowers collected. (11341).

Goniothalamus Curtisii, *King.* A shrub or small tree, endemic, Perak and Selangor. (11191).

Goniothalamus subevenius, *King.* A small tree, endemic, Kedah Peak, Kelantan, Perak. (Burkill and Holttum 8896).

POLYGALACEAE.

Polygala monticola, *Ridl.* A small shrublet, endemic, montane, Gunong Bubu, G. Tahan, G. Mengkuang Lebah, G. Benom. (11272 at 4800 ft.).

HYPERICACEAE.

Cratoxylon arborescens, *Bl.* A tall tree of Indo-Malaya and Indo-China; in the Peninsula Perak, Penang, Selangor, Singapore, usually in the lowlands.

FLACOURTIACEAE.

Hydnocarpus castanea, *Hook. fil.* A tree of Burma and Tenasserim; in the Peninsula not uncommon from Iangkaw to Malacca. (11277 at 4800 ft.).

GUTTIFERAE.

Garcinia eugeniaefolia, *Wall.* A tree of Tenasserim: in the Peninsula Kedah to Singapore, a lowland species. (11321).

Garcinia ?Hombroniana, *Pierre.* A small tree of Tenasserim; wild or planted over the whole Peninsula. (11224).

Calophyllum canum, *Hook. fil.* A tree, endemic, Penang to Singapore. (11282).

Calophyllum near **Griffithii**, *T. Anders.* A tall tree. (11463).

Calophyllum ?retusum, *Wall.* A tree, endemic and rare, known only from Johore and Singapore. (11468. sterile specimens only).

TERNSTROEMACEAE.

Anneslea crassipes, *Hook. fil.* A shrub or small tree of Indo-China and the Philippines; in the Peninsula montane, Kedah, Gunong Tahan, the Main Range and Mt. Ophir. (11155).

Adinandra integerrima, *T. Anders.* A small tree of Siam and Indo-China; common in the north of the Peninsula. (11119 at 3700 ft.).

Adinandra macrantha, *Tees. & Binn.* A tree of Sumatra and Java; in the Peninsula Perak, Pahang, Selangor and Johore. (11320, Burkill and Hillum 7760).

Gordonia singaporeana, *Wall.* A tall tree, endemic and common, more especially in the North. (11177, 11154).

Pentaphylax arborea, *Ridl.* A tree 30 or 40 ft. tall, endemic and local. (11332).

Pentaphylax malayana, *Ridl.* A bush, endemic, Gunong Tahan, G. Benom and the Main Range, not common, but abundant where it occurs. (11325).

Ternstroemia micrantha, *Choisy.* A bush of Sumatra, Java, and Borneo; in the Peninsula known only from this locality. (fide Ridley, Flor. Mal. Pen., Supp. p. 291).

STERCULIACEAE.

Sterculia hyposticta, *Miq.* A small shrub of Indo-China, Tenasserim and Sumatra; in the Peninsula not uncommon in the North. (11382 at 3900 ft.).

TILIACEAE.

Elaeocarpus Hullettii, *King.* A tree, endemic, Penang to Singapore, but not very common. (11306).

RUTACEAE.

Evodia macrocarpa, *King.* A tree endemic and rare, Penang and Taiping. (11018).

Evodia pilulifera, *King.* A shrub, endemic and montane, Taiping Hills, Pahang, Mt. Ophir. (11175).

Tetractomia Roxburghii, *Hook. fil.* A tree, endemic, Penang, Taiping, Singapore. (11328).

Zanthoxylum myriacanthum, *Wall.* A thorny shrub or tree, endemic, Penang to Malacca. (11310).

Glycosmis tomentella, *Ridl.* A shrub, endemic and rare, Mennang Gasing, Selangor. (11170).

SIMARUBACEAE.

Eurycoma apiculata, *Benn.*, var. A shrub, endemic, Penang to N. Johore, commonest in the north. (11230, and collected here by Ridley).

MELIACEAE.

Chisocheton macrophyllus, *King*. A tree of Java; in the Peninsula Penang, Selangor, Singapore. (11390 at 3500 ft.)

Dysoxylon costulatum, *Miq.* A tree of Sumatra; in the Peninsula common. (11284).

Dysoxylon ?macrothyrsum, *Miq.* A tree of Java and Borneo; in the Peninsula Taiping to Singapore. (11451).

Aphanamixis Rohituka, *Pierre*. A tree of India to Sumatra and China; in the Peninsula common. (11322).

OLACACEAE.

Gomphandra lanceolata, *King*. A shrub, endemic and common. (11278).

Gomphandra penangiana, *Wall.* A shrub, endemic, not very common, Penang to Malacca. (11260).

ILACACEAE.

Ilex Kelsallii, *Ridl.* A small tree, endemic and rare, known only from Bukit Hitam, Selangor. (Burkill and Holttum 8693).

Ilex Maingayi, *Hook. fil.* A tree, endemic, not common, Penang, Perak, Selangor, Singapore. (11325).

Ilex triflora, *Bl.* A bush of Indo-Malaya and China; in the Peninsula common in the mountains. (11294).

CELASTRACEAE.

Perrottetia alpestris, *Loesn.* A bush of Sumatra, Java, Borneo and the Philippines; in the Peninsula not common, Perak. (11125 at 3100 ft., and as *Maesa perakensis*, *Ridl.* in the original enumeration, *Gardens' Bulletin* Vol. III p. 58).

SABIACEAE.

Meliosma nitida, *Bl.* A shrub of small tree of Sumatra and Java; in the Peninsula common, usually in the lowlands. (11185, 11209).

ANACARDIACEAE.

Melanorrhoea Curtisii, *Oliv.* A tree endemic, Kedah Peak, Penang Hill, Taiping Hills. (11229, 11336).

? **Melanorrhoea inappendiculata**, *King*. A tree. (11409, at 4200 ft., sterile specimens only).

LEGUMINOSAE.

Ormosia gracilis, *Prain*. A slender tree, endemic and rare, Taiping Hills. (11326).

Saraca taipingensis, *Canley*. A small tree, endemic, common from Taiping to Malacca. (11387 at 3200 ft.).

Pithecolobium Kunstleri, *Prain*. A small tree, of Borneo; in the Peninsula Perak to Johore, usually in lowland forest. (11025).

ROSACEAE.

Parinarium rubiginosum, *Ridl.* A small tree, montane, endemic and rare, Gunong Tahan. (11147 at 3700 ft., 11301).

Pygeum Hookerianum, *King, var.* A shrub or small tree, endemic, the species not uncommon, the var. from Klang Gates, Selangor (fide Ridley). (11164).

Pyrus granulosa, *Bertol.* A tall tree of India to Sumatra; in the Peninsula purely montane, Taiping Hills, Gunong Tahan, Cameron's Highlands. (11241).

LEGNOTIDACEAE.

Gynotroches axillaris, *Bl.* A small tree of W. Malaysia to the Philippines; in the Peninsula common. (11016).

MYRTACEAE.

Eugenia alycifolia, *Ridl.* A tree, endemic and local. (11213).

Eugenia goniocalyx, *Ridl.* A small tree, endemic and local. (fide Ridley, Flor. Mal. Pen. Supp. p. 309).

Eugenia Holttumi, *Ridl.* A tree, endemic and local. (Burkill and Holttum 7751).

Eugenia linoceroidea, *King.* A tree, endemic and rare, Perak. (11456).

Eugenia punctulata, *King.* A tree of Borneo; in the Peninsula not uncommon in the South and on the East coast. (11261, 11469).

Eugenia subdecussata, *Duthie*, var. *montana*, *King.* A small tree, endemic, the species common, the var. from Kedah Peak and Gunong Batu Puteh. (11211, and collected here by Ridley).

MELASTOMATACEAE.

Sonerila caesia, *Stapf.* A herb, endemic, not common, Upper Perak, Batang Padang, Gunong Batu Puteh. (11033).

Phyllagathis rotundifolia, *Bl.* A creeping herb of Sumatra; in the Peninsula common. (11182).

Medinilla Scortechinii, *King*. An epiphytic shrub, endemic and montane, Taiping Hills and the Main Range. (11135 at 3700 ft.).

Momcylon amplexicaule, *Roxb.* A small tree, endemic, Penang to Singapore. (11212).

SAMYDACEAE.

Casearia minutiflora, *Ridl.* A shrub, endemic and local. (Burkill and Holttum 8581).

BEGONIACEAE.

Begonia longicaulis, *Ridl.* A herb, endemic and rare, Gunong Tahan and G. Kerbau. (Burkill and Holttum 8428).

Begonia isoptera, *Dryand.* A creeping herb of Sumatra and Java; in the Peninsula common, usually in the lowlands. (11103 at 3700 ft.).

Begonia perakensis, *King*. A herb, endemic on the Main Range, but usually below 3000 ft. (11035).

UMBELLIFERAE.

Hydrocotyle javanica, *Thunb.* A creeping herb of Indo-Australia, China and Japan; in the Peninsula not common, usually montane, Taiping Hills, Cameron's Highlands, Upper Perak. (11413 at 3800 ft.).

ARALIACEAE.

Aralia Thomsoni, *Seem.* A prickly shrub or small tree of India; in the Peninsula Penang to Negri Sembilan, usually in hilly localities. (11121 at 3700 ft.).

Schefflera subulata, *Viguier*. An epiphytic shrub of W. Malaysia; in the Peninsula common. (11166, 11214).

Trevesia cheiranthia, *Ridl.* A small prickly tree of Burma and Sumatra; in the Peninsula common. (11124 at 3700 ft.).

Trevesia rufosetosa, *Ridl.* A small tree, endemic and local. (11070, and collected here by Ridley).

Brassaiopsis speciosa, *Decne. and Planch.* A small thorny tree of Assam, Siam, Sumatra and Java; in the Peninsula known only from this locality. (Burkill and Holttum 7882).

CORNACEAE.

Mastixia sp. A tree. "Not recognised, flowers wanted." (Ridley). (11291).

Aralidium pinnatifidum, *Miq.* A small tree of Sumatra and Borneo; in the Peninsula common, usually lowland. (11217).

Nyssa sessiliflora, *Hook. fil.* A small tree of India, Burma, Sumatra and Java; in the Peninsula montane, very rare, only known from Gunong Batu Puteh. (11169).

CAPRIFOLIACEAE.

Viburnum lutescens, *Bl.* A shrub or small tree of Sumatra and Java; in the Peninsula a local species, Ulu Batang Padang and into Pahang. (11202).

RUBIACEAE.

Argostemma ?Hookeri, *King.* A slender creeper, endemic and usually montane, Penang, Gunong Tahan, Selangor, Johore. (11167).

Urophyllum macrophyllum, *Korth.* A shrub or tree of Tenasserim, Java and Borneo; in the Peninsula not uncommon in the north, occurring also in Singapore. (11222).

Brachytome Scortechinii, *King and Gamble.* A shrub, endemic, Kedah Peak, Taiping Hills, and the Mam Range. (11178).

Tarennia lancifolia, *Ridl.* A shrub, endemic and rare, Kedah Peak. (Burkill and Holttum 8626, sub *Stylocoryna fragrans*, *Bl.*, Gardens' Bulletin Vol. III, p. 51).

Gardeniopsis longifolia, *Miq.* A shrub of Sumatra; in the Peninsula common. (11172).

Timonius oreophilus, *Ridl.* A shrub, endemic and montane, Kedah Peak, Pahang, Selangor, Mt. Ophir. (11136 at 500 ft., Burkill and Holttum 8922).

Canthium didymum, *Gaertn. fil.* A bush or tree of Borneo; in the Peninsula common. (11055, 11280).

Psychotria stipulacea, *Wall.* A shrub of Sumatra, common in the Peninsula. (11081 at 3700 ft.).

Cephaelis elongata, *Ridl.* A shrubby herb, endemic and local. (Burkill and Holttum 8627, Ridley 12073).

Cephaelis triceps, *Ridl.* A woody herb, endemic and rare, Kuala Lumpur. (Burkill and Holttum 8435, Ridley 15667).

VACCINIACEAE.

Agapetes pubescens, *Ridl.* An epiphytic shrub, endemic and local. (Burkill and Holttum 7828, sub *Agapetes Griffithii*, *C.B.C.*, l.c. p. 56).

MYRSINACEAE.

Embelia myrtillos, *King*. An erect or climbing shrub of Burma; in the Peninsula montane. Kedah, Upper Perak, Main Range, Mt. Ophir. (11271 at 4800 ft.).

SAPOTACEAE.

Sideroxylon firmum, *Pierre*. A small tree of Bangka and the Philippines; in the Peninsula rare, Penang Hill and Mt. Ophir. (11148 at 3700 ft.).

Sideroxylon sp. A tree. (11461).

Payena sp., near *lucida*, *DC.* A tree in fruit. (11327).

STYRACACEAE.

Symplocos adenophylla, *Wall.* A shrub or small tree of Sumatra, Bangka, Borneo and the Philippines; in the Peninsula common. (11159, 11458).

Symplocos ferruginea, *Roib.* A tree of Indo-Malaya to the Philippines and S. China; in the Peninsula Penang, Perak, Pahang, Negri Sembilan, Malacca. (11315, 11462).

Cordyloblaste confusa, *Ridl.* var. with small leaves. A shrub of Borneo and S. China; in the Peninsula rare, Mt. Ophir. (11281).

APOCYNACEAE.

Rauwolfia perakensis, *King and Gamble*. A shrub of Lower Siam; common in the North of the Peninsula. (11107 at 3700 ft.).

Alstonia sp., near **macrophylla**, *Wall.* A tree of which no flowers or fruit have been collected. (11407).

Ecdysanthera rosea, *Bl.* A climber of Java, new to the Peninsula. (Burkill and Holttum 8407).

Trachelospermum obtusifolium, *Ridl.* A climber, endemic and local. (Burkill and Holttum 8898).

ASCLEPIADACEAE.

Tylophora grandiflora, *Ridl.* A twiner, endemic and local. (11482 at 3800 ft.).

LOGANIACEAE.

Fagraea lanceolata, *King and Gamble, not of Blume*. An epiphytic climber, endemic. A doubtful species, of which flowers have not yet been obtained. Collected in the Taiping Hills by Wray. (11288).

Strychnos ovalifolia, *Wall.* A big liane of Borneo; common in the Peninsula. (11188).

Gaertnera latifolia, *Ridl.* A shrub, endemic and local. (Burkill and Holttum 8606).

CONVOLVULACEAE.

Erycibe leucoxytoides, *Prain.* A bushy climber, endemic, Kuala Lumpur, Johore, Singapore. (11321).

Erycibe Stapfiana, *Prain.* A woody climber of Tenasserim; not common in the Peninsula, Larut and Batang Padang, Perak. (11293).

SOLANACEAE.

Solanum Blumei, *Nees.* A shrub of Sumatra, Java and Borneo; in the Peninsula montane in the Taiping Hills, the Main Range, and Johore. (11245).

GESNERACEAE.

Aeschynanthus lanceolatus, *Ridl.* A creeping epiphyte, endemic and rare, known only from this locality and from Cameron's Highlands. (11138 at 3700 ft.).

Ochradocarpa lilacina, *Ridl.* A herb, endemic, not common, montane in the Main Range on Gunung Batu Puteh and G. Mengkuang Lebah. (11046).

ACANTHACEAE.

Strobilanthes Maingayi, *Clarke.* A small undershrub, endemic and montane, Penang, Taiping Hills and the Main Range. (11412 at 3800 ft.).

Pseuderanthemum Teysmanni, *Ridl.* A sarmentose shrub, endemic and common. (11180).

Justicia Maingayi, *Clarke.* A shrubby herb, endemic and rare, Penang Hill. (Burkill and Holttum 8411, placed doubtfully under *J. subalternans* in the original enumeration).

Justicia uber, *Clarke.* A fleshy herb, endemic and common. (11087 at 3700 ft.).

Justicia vasculosa, *Wall.* A herb of Assam, Tenasserim, and Sumatra; widely distributed over the whole Peninsula. (11014).

VERBENACEAE.

Callicarpa sp. A small tree. (11102 at 3700 ft.).

Clerodendron disparifolium, *Bl.* A shrub of Sumatra, Java and Borneo; common in the Peninsula. (11303).

Gomphostemma Curtisii, *Prain*. A large woody herb, endemic, not common, Taiping Hills and the Main Range. (11100).

Gomphostemma lactea, *Ridl.* A woody herb, endemic and local. (11075 at 4200 ft.).

AMARANTACEAE.

Acryanthos aspera, *Lim.* A tall herb, pantropic; common in the Peninsula. (11200).

PIPERACEAE.

Piper Ridleyi, *C. DC.* An erect shrubby plant, endemic, Upper Perak, Main Range, Singapore. (11122 at 3700 ft.).

Piper uncinatum, *Ridl.* An erect pepper, endemic and local. (11343).

MYRISTICACEAE.

Knema conferta, *Warb.*, var. *Scortechinii*, *Warb.* A small tree of Tenasserim and Borneo (the species); in the Peninsula the species common, the var. in Perak. (11313).

Knema oblongifolia, *Warb.*, var. *monticola*, *King.* A shrub or small tree, endemic, the species from Penang to Singapore, the var. montane in Perak. (11126 at 3700 ft., 11249).

LAURACEAE.

Cryptocarya ferrea, *Bl.* A tree of Java; in the Peninsula Penang and Kelantan to Singapore. (11452).

Cryptocarya Scortechinii, *Gamble.* A tree, endemic, not common, Perak and Malacca. (11330).

Nothaphoebe reticulata, *Gamble.* A tree, endemic and montane, Taiping Hills and the Main Range. (11253).

Phoebe declinata, *Nees.* var. *sericea*, *Gamble.* A tree of Java and Sumatra (the species); in the Peninsula not common. Penang to Singapore, the var. montane in Perak. (11331).

Actinodaphne Maingayi, *Hook. fil.* A tall tree, endemic, Perak, Malacca, Singapore. (11314).

Actinodaphne poleifolia, *Gamble.* A shrub of Borneo; in the Peninsula montane, Perak, Pahang. (11232).

Actinodaphne sp. near *Ridleyi*, *Gamble.* A small tree. (11023).

Actinodaphne sesquipedalis, *Hook. fil.* A tree of Borneo (a var. only); in the Peninsula Penang, Perak, Pahang. (11073 at 4800 ft.).

***Litsea panamonja*, Hook. fil.** A tree of India, Burma and Lower Siam; in the Peninsula rare, Taiping Hills, Malacca. (11406 at 4200 ft.).

***Lindera caudifolia*, Ridl.** A small tree, endemic and rare, Penang. (11235, and collected here by Ridley).

***Lindera selangorensis*, Ridl.** A shrub or small tree, endemic, Semangkok Pass and Gunong Mengkuang Lebah. (11003).

HERNANDIACEAE.

***Illigera lucida*, Teyssm. and Binn.** A slender climbing of Java; in the Peninsula not common, Perak, Johore. (11484 at 3800 ft., 11194).

PROTEACEAE.

***Helicia Kingiana*, Prain.** A tree, endemic, not common, Taiping Hills and Gunong Batu Puteh. (11173).

LORANTHACEAE.

***Loranthus malaccensis*, Hook. fil.** A parasitic bush, endemic and not common in open places. (11144 at 3700 ft.).

***Loranthus productus*, King.** A parasitic shrub, endemic and rare, Taiping Hills and Ulu Batang Padang. (11389 at 3500 ft.).

***Elytranthe albida*, Bl.** A large parasitic shrub of Indo-Malaya; in the Peninsula Penang to Singapore, not very common. (11308).

***Elytranthe avenis*, G. Don.** A parasitic shrub of Sumatra and Java; in the Peninsula montane, Kedah Peak, Perak, Pahang. (11323).

SANTALACEAE.

***Henslowia Ridleyi*, Gamble.** A climbing parasitic shrub, endemic and montane, Gunong Tahan, G. Benom. (11286).

OPILIACEAE.

***Lepionurus sylvestris*, Bl.** A small shrub of Siam, Java and Borneo; common in the Peninsula. (11384 at 3300 ft.).

BALANOPHORACEAE.

***Balanophora truncata*, Ridl.** A parasite, endemic and montane in the Taiping Hills and the Main Range. (11132 at 3700 ft.).

EUPHORBIACEAE.

Aporosa Maingayi, *Hook. fil.* A small tree, endemic. Kedah to Singapore, usually lowland. (11317).

Aporosa lunata, *Benth.* A tree of Sumatra and ?Java; in the Peninsula Penang, Perak, Pahang. Singapore. (11388 at 3200 ft.).

Baccaurea Griffithii, *Hook. fil.* A tree, endemic and common. (11123 at 3700 ft.).

Baccaurea parviflora, *Müll. Arg.* A small tree of Burma, Sumatra and Borneo; in the Peninsula common. (11302).

Baccaurea velutina, *Ridl.* A tree, endemic and local. (11319, also collected by Ridley at the Semangkok Pass).

Galearia affinis, *Hook. fil.* A shrub of ?Siam; in the Peninsula common. (11319).

Macaranga sp. Apparently a species new to the Peninsula, but flowers have not been collected. (11161).

URTICACEAE.

Gironniera subaequalis, *Planch.* A tall tree of Ceylon to the Philippines and New Guinea, and S. China; in the Peninsula common. (11334).

Ficus villosa, *Bl.* A strong climbing shrub of Sumatra to the Philippines; in the Peninsula Penang to Singapore. (11166 at 3800 ft.).

Artocarpus polyphema, *Pers.* A tall tree of Java; in the Peninsula common. (11254).

Laportea stimulaus, *Miq.* A small tree with stinging hairs, of Siam, Java and Borneo; in the Peninsula not uncommon in the north. (11193).

Villebrunea sylvatica, *Bl.* A tree of Java; in the Peninsula not common, Selangor and Negri Sembilan. (11093 at 3700 ft.).

JUGLANDACEAE.

Engelhardtia Wallichiana, *Lindl.* A tall tree, endemic, Penang, Taiping Hills. (11305).

CUPULIFERAE.

Pasania conocarpa, *Schky.* A tall tree of Sumatra, Java and Borneo; in the Peninsula not uncommon, usually in the lowlands. (11231).

Pasania ?Scortechinii, *Schky.* A tall tree, endemic and rare, Taiping Hills. (11315).

Pasania ?Wenzigiana, *Gamble.* A tall tree of Borneo; in the Peninsula not common, Penang and Perak. (11077 at 4300 ft.).

ORCHIDACEAE.

Bulbophyllum oeneum, *Burkill.* A small creeping herb, endemic and local. (11298, Burkill and Holttum 2676).

Eria Scortechinii, *Hook. fil.* An epiphytic herb, endemic and montane, Gunong Tahan, G. Benom, and the Main Range. (11061 at 4800 ft. and collected here by Ridley).

Trichotosia microphylla, *Bl.* A creeping epiphyte of W. Malaysia; in the Peninsula rare, known only from this locality (Burkill and Holttum 7799).

Phreatia listrophora, *Ridl.* A small epiphyte, endemic and montane, Langkawi, Gunong Tahan, Taiping Hills. (11396, and collected in this neighbourhood by Ridley).

Ceratostylis ?cryptantha, *Ridl.* A dwarf tufted epiphyte, endemic, Penang Hill, Taiping Hills. (11239).

Chelstonele perakensis, *Ridl.* An epiphyte, endemic and usually montane, Perak, Pahang and Singapore. (11300).

Appendicula robusta, *Ridl.* An erect terrestrial herb, endemic and local. (Burkill and Holttum 8856 at 3600 ft.).

LILIACEAE.

Tupistra grandis, *Ridl.* A herb, endemic and montane, Gunong Kerbau, Bujong Malacca, Batang Padang, Perak. (11381 at 3900 ft.).

Dracaena elliptica, *Thunb.* A shrub of Indo-Malaya; in the Peninsula Kedah to Singapore. (11189).

PALMAE.

Areca pumila, *Bl.* A small palm of Siam and Java; in the Peninsula Langkawi to Singapore. (11255).

Daemonorops callicarpus, *Mart.* A tufted palm, endemic, Penang to Johore. (11208).

Daemonorops geniculatus, *Mart.* A rattan, endemic, Kedah to Singapore. (11131 at 3700 ft.).

PANDANACEAE.

Pandanus globuliferus, *Ridl.* A small shrub, endemic and local. (11022. First collected here by Ridley in 1911).

Pandanus Houlettianus, *Curr.* A shrub, endemic, not common. Negri Sembilan, Johore, Singapore. (11253).

ARACEAE.

Amorphophallus sp. A large tuberous herb, of which a fruiting specimen only was collected. (11002).

Alocasia denudata, *Engl.* A herb of Lingga and Borneo; in the Peninsula Langkawi to Singapore. (11108 : t 3700 ft.).

Homalomena caerulescens, *Jungh.* A herb of W. Malay-
sia; in the Peninsula common. (11380).

Homalomena mixta, *Ridl.* A herb, endemic and rare, Tahan river. (11091 at 3700 ft.).

Schismatoglottis mutata, *Hook. fil.* A herb, endemic, not common, Perak, Kelantan. (11287, and Burkill and Holttum 8696 may be this).

Pothos Barberianus, *Schott.* A climbing herb of Sumatra and Borneo; in the Peninsula Taiping Hills and the Dindings. (11145 at 3700 ft.).

CYPERACEAE.

Scleria radula, *Hance.* A sedge of Hongkong; in the Peninsula rare, Gunong Tahan, G. Kerbau. (11117 at 3700 ft.).

GRAMINEAE.

Thysanolaena agrostis, *Nees.* A tall grass of India to New Guinea; in the Peninsula not uncommon in hill forest, but not occurring south of Fraser Hill. (11157).

Bambusa pauciflora, *Ridl.* A small bamboo, endemic and local. (11234).

M. R. HENDERSON.

RAINFALL

at the Botanic Gardens, Singapore, during the first half of the
year 1925.

Readings taken at 9 a.m. and expressed in inches.

Date	Jan.	Feb.	March	April	May	June
1	..	.01	..	..	..	..
2	.01	2.39	..	..	.09	..
3	..	2.84	..	..	.11	..
4	.11	.35	..	.19	..	..
5	.37	1.76	.10	.34	.40	.09
6	.77	1.01	..	.34	.46	..
7	1.01	1.84	.01	.47	..	..
8	7.88	.15	1.04	..	..	..
9	2.06	.09	1.56	..	..	..
10	.22	.06	..	.06	.90	.05
11	.15	.31	.12	.09	..	trace
12	5.07	trace	.62	.01	..	.18
13	.24	.72	.40	..	..	.72
14	.18	.69	.26	..	..	.98
15	..	.21	..	2.21	..	..
16	.44	.19	.25	..	trace	..
17	.05	..	.06	.11	.11	.97
18	.14	..	.63	.22	..	..
19	.04	.10	trace	..	..	.25
20	..	.16	..	.28	.91	.03
21	..	.63	..	..	trace	.20
22	trace	.59	..	..	.28	.19
23	1.19	.02	2.59	..	.12	..
24	trace	..	.01	..	4.91	..
25	.04	..	1.64	..	.01	..
26	..	..	..	..	..	..
27	.23	..	.05	.11	.21	..
28	..	..	..	.38	.07	.83
29	.34	..	.27	.02	..	trace
30	..	..	.01	..	1.99	1.43
31	.63	..	.05	..	.01	..
Total	21.47	14.12	9.68	4.83	10.58	5.92

RAINFALL

at the Botanic Gardens, Singapore, during the second half of the
year 1925.

Readings taken at 9 a.m. and expressed in inches.

Date	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.01	1.58	.08	..	..	.02
2	.31	trace	.41	.31	.16	.06
3	.41	..	.76	..	.25	.12
4	..	1.33	1.29	.50	..	1.53
5	..	..	.55	.32	..	.40
6	..	.70	..	.18	trace	.84
7	1.22	.01	..	1.32	.79	.10
8	..	.83	.39	2.92	..	.03
9	..	.51	..	.11	1.85	.16
10	..	..	.01	.02	.39	trace
11	..	..	.30	.01	.06	.20
12	..	..	.02	..	..	.40
13	.03	..	1.47	..	..	.01
14	..	trace	.01	..	.71	.14
15	..	..	..	1.78	.61	.12
16	.01	..	.04	..	.43	.76
17	..	..	.01	1.99	3.14	.18
18	.02	..	.03	trace	trace	.77
19	trace	1.94	..	2.51	..	trace
20	..	trace	.18	.38	..	..
21	.21	..	.05	.79	trace	1.91
22	.02	1.50	..	.25	.22	trace
23	..	.01	..	..	.02	..
24	..	..	.23	..	..	.01
25	.06	..	..	.25	.16	.03
26	..	trace	..	trace	.32	.01
27	trace	.15	..	..	.04	.96
28	..	..	..	.05	1.56	1.04
29	..	trace	..	..	.64	.49
30	..	.25	..	.78	.86	1.00
31	.20	..	..	.01	..	.40
Total	2.56	8.71	5.83	14.78	12.21	11.69

RAINFALL

at the head of the Waterfall Gardens, Penang, during the first half of the year 1925, in inches.

Readings taken at 8 a.m., and credited to the date in which the twenty-four hours began. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	Jan.	Feb.	March	April	May	June
1	.31	..	.21	.09	.42	..
2	..	.07	..	2.10	..	.61
3	.02	.02	..	.05	.23	..
4	..	..	.69	..	1.12	.15
5	.62	..	..	1.63	..	..
6	.02	.44	.16	1.82	2.05	..
7	.06	.03	.18	.37	.05	..
8	.07	..	.24	..	..	.22
9	..	..	.02	..	.62	..
10	.29	..	..	.06	.13	.11
11	..	..	.60	.18	..	..
12	.03	..	1.16	..	..	..
13	.58	.03	.51	.04	3.22	3.17
14	.05	..	.31	.86	..	.72
15	.91	..	..	1.65	.08	..
16	.08	.17	1.81	.28	.27	.52
17	.78	..	.03	.39	1.05	.90
18	.02	..	.25	.55	..	.16
19	..	..	.10	.12	.07	1.26
20	..	.09	..	.05	.95	1.53
21	.04	.10	..	..	.22	5.13
22	..	..	.15	..	.10	.58
23	..	..	5.57	.14	.02	.02
24	..	..	2.66	..	..	..
25	..	..	.03	.02	..	..
26	..	..	.24	1.22	..	..
27	..	..	.27	.32	.18	..
28	..	..	1.19	.20	.32	..
29	..	..	.78	.50	..	..
30	.18	..	..	.84	.18	..
31	1.87	..	.16	..	..	..
Total	5.96	.95	18.28	13.48	11.28	15.74-

RAINFALL

at the head of the Waterfall Gardens, Penang, during the second half of the year 1925, in inches.

Readings taken at 8 a.m., and credited to the date in which the twenty-four hours began. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.06	.41	.07	.53	.90	..
2	..	..	.94	.37	.24	.15
3	..	.93	.03	.03	.10	.55
4	..	.28	.75	.30	..	.03
5	..	.03	1.73	10.43	..	.06
6	.52	.88	.56	5.59	.29	..
7	.40	..	.03	7.60	.11	.03
8	.89	..	1.76	2.19	.11	..
9	..	.14	.68	3.85	1.12	.10
10	..	..	..	2.18	.03	.03
11	..	..	2.96	1.20	..	.41
12	..	.55	.03	.12	.07	.20
13	..	..	.10	.09	..	.15
14	..	.49	.15	1.98	.90	.54
15	..	1.20	..	..	1.84	1.21
16	..	.57	..	.16	.04	.09
17	..	.16	.36	.22	.13	.12
18	.03	2.14	..	..	..	..
19	.45	1.79	.46	.66	.74	..
20	..	.17	.10	.68	1.87	..
21	.03	.03	.07	.90	.04	.03
22	..	.62	..	1.15	1.57	2.38
23	.10	.03	1.28	1.30	.03	..
24	..	.80	.04	..	..	.03
25	.12	.39	.60	.93	.32	..
26	.17	.04	..	.25	4.18	..
27	1.66	.40	..	.52	.42	..
28	1.62	..	1.20	.28	1.62	..
29	..	..	.03	..	.25	..
30	.07	..	..	..	3.55	..
31	1.23	..	..	1.92	..	..
Total	7.35	12.08	13.93	45.73	20.47	6.11

RELATIVE HUMIDITY for the year 1925 from wet and dry
bulb readings made at 9 a.m. in the Botanic Gardens,
Singapore.

Date.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	77	75	75	65	77	74	83	79	91	74	85	89
2	69	95	74	86	81	79	71	79	93	87	70	74
3	68	94	72	79	79	...	91	75	82	76	82	71
4	79	93	81	68	77	65	73	75	83	85	86	85
5	74	97	92	96	74	89	73	75	85	79	77	87
6	83	98	82	95	72	72	79	80	70	78	70	95
7	83	100	85	86	77	70	86	84	75	86	70	78
8	97	88	97	78	74	72	75	100	80	93	71	86
9	79	86	77	76	83	74	72	78	77	85	82	93
10	83	78	75	79	81	86	79	77	87	73	75	86
11	89	86	78	83	79	74	76	79	77	91	73	97
12	78	85	78	80	72	78	77	79	84	77	66	84
13	80	91	88	75	72	79	79	77	86	74	66	75
14	81	83	79	79	79	93	77	81	75	79	71	73
15	81	91	77	77	68	73	79	71	73	78	69	78
16	82	84	74	83	76	74	74	79	77	72	72	81
17	77	73	88	77	81	87	75	79	79	77	75	81
18	85	72	82	70	74	77	83	73	70	82	68	83
19	77	91	68	79	76	79	72	95	77	85	77	72
20	84	99	76	76	78	89	74	81	91	73	72	70
21	75	78	68	77	77	83	79	71	74	95	69	78
22	76	80	74	76	83	87	77	73	72	81	80	90
23	75	78	68	70	81	76	71	83	75	81	72	80
24	81	71	75	79	83	87	68	68	70	87	69	73
25	73	86	75	74	76	79	93	75	71	86	76	82
26	77	69	83	72	79	79	79	83	69	61	80	82
27	87	72	80	72	90	74	79	81	68	71	83	95
28	76	71	74	91	79	79	75	73	68	91	81	91
29	93	...	93	72	75	75	75	76	70	67	95	79
30	76	...	76	67	90	93	74	51	70	77	89	83
31	95	...	80	...	74	...	89	81	...	91	...	95
Mean	80.4	84.3	79.0	77.8	78.0	79.0	77.7	79.0	77.2	80.1	76.2	83.0

Mean for the year 79.3

Summary of Rainfall, 1925.

	SINGAPORE				PENANG			
	No. of rainy days	Amount of rain		Longest Spell without rain	No. of rainy days	Amount of rain		Longest Spell without rain
		inches	mm.			inches	mm.	
January	23	21.47	527	2 days	17	5.96	146	8 days
February	21	14.12	346	9 "	8	.95	23	9 "
March	19	9.68	237	6 "	23	18.28	448	2 "
April	16	4.83	118	5 "	23	13.48	330	2 "
May	17	10.58	259	5 "	19	11.28	276	3 "
June	14	5.92	145	5 "	14	15.74	386	8 "
July	13	2.56	68	5 "	11	7.35	180	9 "
August	16	8.71	216	4 "	21	12.08	296	4 "
September	17	5.83	142	7 "	22	13.98	341	2 "
October	21	14.78	362	3 "	26	45.73	1120	1 "
November	21	12.21	300	2 "	24	20.47	502	2 "
December	29	11.69	286	1 "	17	6.11	150	8 "
Total	227	122.38	3006		228	171.36	4198	

Greatest amount in 24 hrs. 7.88 ins. or 191mm.

10.43 ins. or 256 mm.

" " 48 hrs. 9.94 ins. or 243mm.

16.02 ins. or 392 mm.

72 hrs. 10.95 ins. or 268mm.

23.62 ins. or 579 mm.

Excessively rainy periods, over

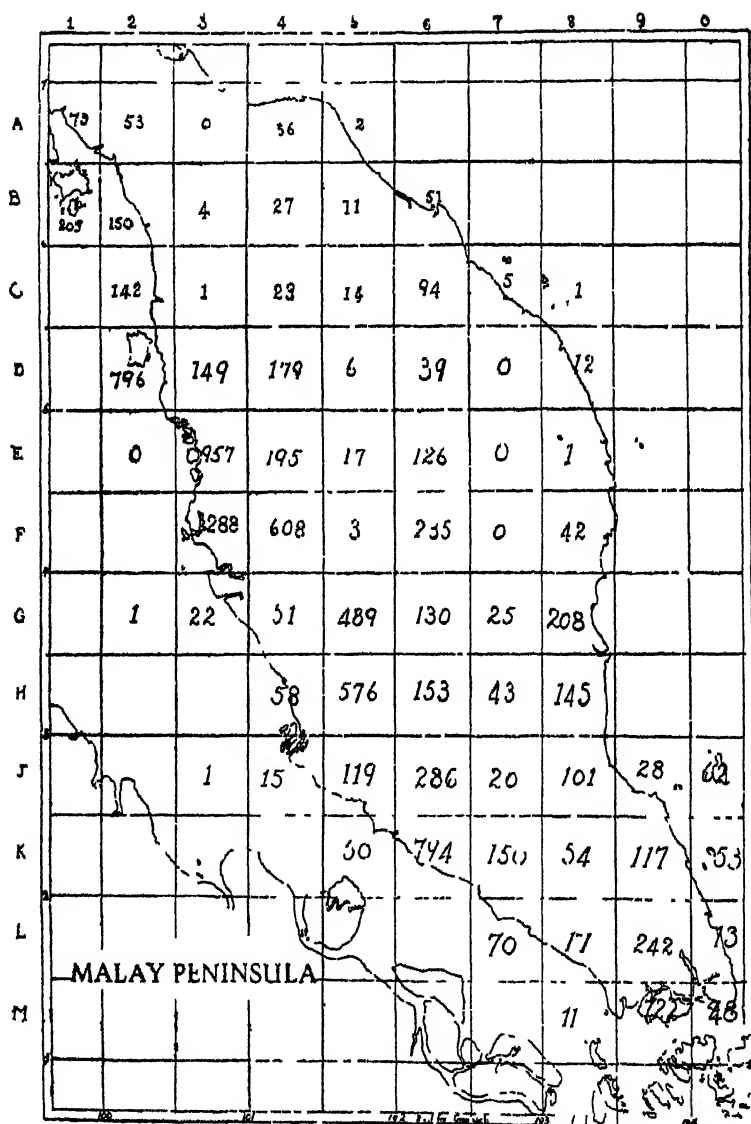
5 ins. having fallen in 72

hours 3 (Jan.
(2) Feb.)6 (March, June, Oct. (3),
Nov.)

Excessively dry periods, less than

.02 in. having fallen in 120

hours 8 (Feb.
March, Apr., May, June, July (2)
Aug., Sept.)6 (Jan., Feb. (2), June,
July, Dec.)



THE GARDENS' BULLETIN

STRAITS SETTLEMENTS

Vol. IV.

AUGUST, 1927.

Nos. 4 & 5

BOTANICAL COLLECTORS, COLLECTIONS AND COLLECTING PLACES IN THE MALAY PENINSULA.

A review of the work so far done towards a knowledge
of the plant-geography of Malaya.

BY I. H. BURKILL, M.A., F.L.S.

Mr. Ridley's *Flora of the Malay Peninsula*, south of 7° N. Lat. having been published and in regard to the higher plants the taxonomic foundation having been prepared thereby, it is appropriate that stock be taken at once of the knowledge that we possess upon the distribution of plants within the Peninsula. Towards that objective the following report is a first step. It brings out no scientific conclusions; but it indicates as concisely as possible in what measure the parts of the Peninsula have been botanised. A traveller touching at Penang will find in it the names of all who have collected plants in that island, and where their collections lie. The resident—let us say at Ipoh, but any name will serve—will obtain an estimate of how much remains to be done in the collecting of information within his circle. The administrator, who has power to direct collecting, will feel guided as to the way in which he can most profitably dispose his resources. The student, examining the herbaria which exist, will find in it a vade-mecum for the interpretation of too-often inadequate labels.

The report is in three parts:—(1) the collectors—an alphabetical list of all whose names are known to occur upon the labels of Malayan herbarium specimens, embodying sufficient biographical information for our purpose; (2) the collections, under which head the whole Peninsula is considered by squares of a half-degree of latitude and longitude—71 of them—and the work done in each set down; and (3) the collecting places, an index to the place-names which occur on the labels in herbaria, and at the same time an index to part 2.

There are two maps in the report. Upon the first the squares are all marked. These squares explain themselves, except that *1a* has been stretched a little to the west that all the Butang islands may be got into it; and square *0k* has been stretched a little to the east that Pulau Aor and

the islets near it may be included. A complete square of level land has a surface of about 1,225 square miles, a large area for our purpose, but to deal with subdivisions proves impossible. Of the 71, 28 alone have the full complement of land: the rest are all in part of sea.

The first map carries a figure in each square, the figure being the number of plants of the orders contained in the first volume of Mr. Ridley's *Flora* *, which can be proved to occur within each square. Add all the figures together and the total of 9,410 is obtained: but by reason of double and treble records for squares, the data compressed into the map by a very long way exceed this figure, and have been laborious to collect. That is why a halt has had to be called at the end of examination of the first volume, but the data on the data on the map do really suffice for the estimation of our knowledge in the form of a very approximate percentage.

The second map graphically indicates the percentages arrived at.

The lowness of these percentages as a whole is surprising. They read us a warning against hasty conclusions: they tell us how little we know; and that the square of Mount Ophir carries a figure so low as 12 and the square of Gunong Tahan one so low as 18, is material for consideration.

One more remark. The three Settlements,—Penang, Malacca and Singapore have received considerable attention, and a list of the places in them whereat plants have been collected would be long and extend Part 3 much; but to make one has not seemed necessary, for collectors' labels in regard to them have rarely proved misleading. Village names from these three Settlements, therefore, will only for special reasons † be found in the list. Good maps on a large scale are to be had and meet the rest of the need.

It is evident that orderly work can be based on the report.

In concluding these introductory remarks, Mr. Ridley, Colonel Kelsall, Dr. Gimlette and Dr. Foxworthy must be thanked for the kind way in which they supplied information.


* Begoniaceae had to be omitted from the count because the specimens of the Singapore herbarium are on loan and under elaboration in Germany.

† The majority of the special cases are where confusion may arise because the place-name is one of frequent occurrence; the following for instance are repeated from end to end of the Peninsula:—Ayer Hitam, or Black Water, Ayer Kuning, or Yellow Water, Bukit Putus, or the hill of the divide, Kota Baharu, or the new fort, Simpang Ampat, or cross roads, Tebing Tinggi or the upper bank (suitable for landing), Bukit Kayu Arang, or Diospyros hill, Pulau, or the *Alstonia* tree,



THE COLLECTORS.

**A list as complete as possible of all whose names
appear upon the labels of Malayan
specimens in Herbaria.**



ABRAMS, J.

A sergeant of Forest Guards, and later Forest Ranger, in Penang, 1888-1910, who obtained specimens for Curtis.

AHMED bin IASSAN.

Employed by the Botanic Gardens, Singapore, 1901-; earlier collections numbered along with Ridley's; and later in Burkill's "Singapore Field Number" Series.

ALVINS, M. V.

Collector employed in the Forest Department of the Straits Settlements, 1884-1888 in Malacca, whence he journeyed into Negri Sembilan (Sungei Ujong State). His specimens are in the Singapore Herbarium and have been quoted as Cantley's Collector's or briefly as Cantley's. He numbered in the field.

ANDERSON, James Webster.

An Assistant Curator in the Gardens Department, Straits Settlements, 1910-1917, during which time he made small collections conserved at Kew and Singapore. He numbered in the field.

ANDERSON, Thomas. (1832-1870).

A surgeon under the Government of India, and from 1860-1868, Superintendent of Royal Botanic Gardens, Calcutta. On a journey to Java in connection with Cinchona culture, he found, in 1861, an opportunity of collecting plants in Singapore for the Calcutta Gardens. (Dict. Nat. Biogr. 1, 392).

ANNANDALE, Thomas Nelson. (1876-1924).

Superintendent of the Indian Museum, Calcutta and Director of the Zoological Survey of India. In 1899 he was attached to the Skeat Expedition, and in January and February, 1916, he revisited the same region. His collections of 1916 are in the Singapore Gardens, and were numbered in the field with Singapore Field Numbers. (Records Ind. Mus. Calcutta, 27, 1925, p. 1).

ARDEN, Stanley.

Employed in the Agricultural Department (1900-190). He sent plants to Singapore in 1902.

ASKEY, A. M.

A ranger in the Forest Department (1906-1922).

ASKEY, J. F.

A ranger in the Forest Department (1905-1910).

BAKER, Charles Fuller.

Professor and Dean of the College of Agriculture, Los Banos, Philippine Islands; in 1917 on the staff of the Botanic Gardens, Singapore; phanerogams in the Singapore Herbarium, and fungi widely distributed.

BARNARD, Basil H. F.

In the Forest Department, 1896– , chiefly in Perak, where he collected specimens of forest trees, etc.

BARNES, Warren Delabere. (1865–1911).

Of the Malayan Civil Service (1888–1910), and afterwards Colonial Secretary, Hongkong: conducted an expedition towards the mountain of Benom in 1900, and made a collection of plants upon a subsidiary summit. (Jour. Straits Branch Roy. As. Soc. No. 60, 1911, p. 4).

BAZELL, Clive.

Educational officer, stationed at Kuala Kangsar: sent to Singapore a small collection of plants from the summit of Gunong Bubu in 1923.

BECCARI, Odoardo. (1843–1920).

Naturalist and traveller in Malaysia (1865–1880). When in Singapore upon his way to Borneo, etc., he collected plants. His herbarium is in Florence. (Ann. del Mus. Civ. de Storia Nat. di Genova, Ser. 3, 9, 1921, p. 242).

BECHER, H. M.

A miner who lost his life in a flood in 1898 when exploring towards Gunong Tahan. He collected a little about Kuala Tembeling, Pahang.

BELL, L. M.

Municipal Engineer, George Town, Penang (1904–1920) and a member of the Committee for the management of the Waterfall Gardens, Penang; collected on Kedah Peak, in 1911, specimens which are at Singapore.

BELL, V. G.

Assistant Conservator of Forests, F.M.S. (1912–), since 1921 Conservator of Forests, Kedah. Sent plants from Kedah.

BEST, George Arnold.

Assistant Curator in the Gardens Department, Straits Settlements (1921–), collections in Singapore as part of the "Singapore Field Number" series.

BINSTEAD, Rev. Charles Herbert.

Paid a visit to Penang and Singapore in 1913 and collected mosses.

BLAND, Mrs. (Laura Shelford).

Wife of R. N. Bland, Resident Councillor, Penang, collected on the Taiping Hills in 1905 plants which are at Singapore.

BLOW, Thomas Bates.

Visited Singapore in 1904 and collected Characeae.

BORGES, V. P.

Extra Assistant Conservator in the Forest Department 1903-1924).

BOXALL, Richard.

Employed by the firm of Hugh Low and Co. to collect plants of horticultural value; he visited Kedah Peak and the Settlements about 1880.

BROOKS, Frederick Tom.

University lecturer in Botany, Cambridge. In 1914 temporarily in the Agricultural Department, and collected around Kuala Lumpur, Province Wellesley and elsewhere.

BRYANT, Alfred Thomas.

Of the Malayan Civil Service (1883-1918). Collected plants a little in the Dindings in 1890.

BURBIDGE, Frederick William. (1848-1905).

Traveller for ornamental plants in the employ of Messrs. Veitch; visited Singapore and southern Johore in 1877 and 1878; plants of his are at Kew. (*vide* Hortus Veitchii, p. 75, and his own "Gardens of the Sun").

BURKILL, Mrs. (Ethel Maud Morrison).

Wife of the following; collected and made drawings of Fungi for the Botanic Gardens, Singapore; numbered in the field.

BURKILL, Isaac Henry.

Director of Gardens, Straits Settlements (1912-1925); numbered in the field in a series labelled "Singapore Field Number," to which the whole Department and others contributed.

BURN-MURDOCH, Alfred M. (1868-1919).

Chief Forest Officer, afterwards Conservator of Forests, Federated Malay States and Straits Settlements, 1901-1914; collected forest trees in many places, and in 1913 contributed to the "Singapore Field Number" series. (Indian Forester, 40, p. 155).

C..... (H. C.).

A correspondent of the Botanic Gardens, Calcutta, who after having been in the Moluccas, sent plants from Penang to Roxburgh in 1798.

CANTLEY, Nathaniel. (-1888).

Superintendent of the Botanic Gardens Singapore (1880-1888), and of Forests (1885-1888); he collected plants in 1881 which are at Kew, and after 1881, which are in the Singapore Herbarium. Jour. Kew Guild, 1898, p. 37).

CHIPP, Thomas Ford.

Assistant Director, Royal Botanic Gardens, Kew; from 1914 to 1921, Assistant Director of Gardens, Singapore; collected in Singapore and elsewhere, chiefly Cryptogams.

CLERK, C. A.

Extra Assistant Conservator of Forests, Federated Malay States, 1910-1920. Collected in Negri Sembilan.

CRADDOCK, W. H.

Of the Burma Forest Service; worked on deputation in the Malay Peninsula, 1902-1903, and sent Pahang plants to Singapore.

CUBITT, George Eaton Stannard.

Conservator of Forests from 1915; specimens of forest trees collected in various places in his departmental herbarium and in the Botanic Gardens, Singapore.

CUMING, Hugh. (1791-1865).

Traveller and naturalist; visited Malacca and Singapore in 1839 and perhaps Singapore in 1835, when voyaging to and from the Philippine islands. His Malacca herbarium specimens have often been quoted in error as Philippine. Sets are in the herbaria at South Kensington and Kew; he sent living orchids both to the Calcutta Gardens and to the firm of Loddiges. (Dict. Nat. Biogr. 13, p. 295; Merrill in Phil. Journ. Science, 30, 1926, p. 159).

CURTIS, Charles.

Superintendent of Gardens and Forests, Penang (1884-1902); built up a herbarium in Penang which in 1910 was incorporated into that in the Botanic Gardens, Singapore. The numbers were put on to the specimens only after study.

DALHOUSIE, the Countess of (Christina Broun).

Wife of the 9th Earl and Commander in Chief in India, 1829-1832; collected in Penang, plants which were sent to Kew.

DE MORGAN, J.

A Civil Mining Engineer who made the first map of the Perak river. He collected a few ferns on Gunung Chabang which is over the Sungei Kerbau.

DE ZYLVA, E. R.

In the service of the Forest Department, Pahang, 1904- .

DERRY, Robert.

Assistant Superintendent of Forests, Malacca (1885-1888); partly in Malacca, partly in Perak (1889-1903); Assistant Superintendent, Botanic Gardens, Singapore (1904-1908); Superintendent of Gardens and Forests, Penang (1908); Curator, Botanic Gardens, Singapore (1909-1913). In 1889 he sent plants to Kew; at various times he collected plants which are in the Singapore Herbarium.

DESCHAMPS, E.

Traveller; collected plants in easily accessible places near Penang and as far as Batu Gajah in 1900 and 1901, which were given to the Calcutta Gardens.

DESHMUKH, Gopal Bhikajee.

Field Assistant to the Botanic Gardens, Singapore (1918-1921); collected in and near Singapore.

DAUD.

In Herb. Wight are plants labelled "Singapore, Dawood." It is assumed that they came from a Malay collector named Daud, perhaps through Robert Wight's sea-faring brother.

DAUD, see TASSIM DAUD.**DOCTORS van LEEUWEN, W.**

Director of the Botanic Gardens, Buitenzorg, Java; visited the Straits Settlements in 1920 and collected specimens chiefly cecidological, which are conserved at Buitenzorg.

DOWN, St. Vincent B.

Merchant of Singapore and afterwards of Sarawak; for many years on the Gardens Committee, Singapore; collected and gave plants to the Botanic Gardens, Singapore.

DRUCE, George Claridge.

Fielding Curator, Botanic Gardens, Oxford; visited Singapore in 1908.

DURNFORD.

A miner of Kuantan, who collected orchids and contributed them to the Singapore Gardens in 1889.

ELPHINSTONE, Sir Graeme H. D.

One of the earlier of the European planters in Perak; collected a little on the Taiping Hills, and his plants were given to Singapore.

ELLIS, William Gilmour.

Principal Colonial Medical Officer, Singapore; on the Gardens Committee in 1903, and collected plants in a few places.

ENGLER, Adolf.

Professor of Botany in the University and Director of the Botanic Gardens, Berlin; visited Singapore and Kuala Lumpur in 1905; collections presumably in the Berlin Gardens.

EVANS, I. H. N.

In the Museum Department, Federated Malay States; collected plants in many parts of Pahang in 1917, and also elsewhere. The collections were sent to Kew.

FARQUHAR, Colonel William.

As a Major, Resident of Malacca, later the first Resident of Singapore; employed a native to delineate the plants of the Peninsula, and submitted these drawings to Jack and Wallich. He climbed Mount Ophir and collected a little on it.

FEDDERSEN, Poul.

Planter and surveyor; collected orchids and other plants, sending specimens to the Botanic Gardens, Singapore (1916-).

FEILDING, J. B.

At the instance of the Government of Johore in 1892 visited the foot of Mount Ophir, and several places upon the coasts of the State, from the Kesang river round to the Endau and to the islands off the latter. Part of his journey was in the company of Lake and Kelsall, which accounts for plants having come from both Feilding and Kelsall from such places as Jambu Larang.

FERGUSON-DAVIE, Mrs. (Charlotte Elizabeth Hull).

Doctor of Medicine, wife of the Bishop of Singapore; collected plants in 1921 about Fraser Hill on the Main Range for the Singapore Gardens.

FERNANDEZ, Emanuel.

A collector employed by Griffith in Malacca while he was in Calcutta and presumably during his first residence in Malacca.

FINLAYSON, George.

Surgeon in the service of the East India Company; naturalist on the mission to Siam of 1821-23; collected plants which were distributed by Wallich in 1827-1832. (Dict. Nat. Biogr. 19, p. 32).

FLEISCHER, Prof. Dr. Max.

Visited Singapore, Kuala Lumpur and Penang in the year 1898, and collected mosses.

FLIPPANCE, Frederick.

An Assistant Curator in the Gardens Department, Straits Settlements, 1919- ; contributed to the "Singapore Field Number" series.

FOX, Walter.

In the service of the Gardens Department from 1878 to 1910, first in Singapore and then as Superintendent of Gardens and Forests, Penang; collected plants for Ridley.

FOXWORTHY, F. W.

Joined the Forest Department in 1918; collected in many parts of the Peninsula.

FURTADO, Cajetano Xavier.

Field Assistant in the Gardens Department, Straits Settlements, 1923- ; contributed to the "Singapore Field Number" series.

GAUDICHAUD-BEAUPRÉ, Charles. (1789-1844).

Traveller and collector; upon his second voyage round the world, 1835-1836, he touched at Singapore, Malacca and Penang, collecting a little, which is preserved at the Jardin des Plantes, Paris.

GIMLETTE, John D.

Surgeon in Government service, Malay States. Sent plants from Kuala Lebir, Kelantan, to the Singapore Gardens in 1904 and from Kota Bahru, Kelantan, from 1909.

GOLDHAM, C.

Educational Officer stationed at Ipoh and Kuala Kangsar, where he collected orchids, and from whence he sent specimens to Singapore.

GOODENOUGH, J. S.

Entered the Forest Service in 1888, and served in Malacca, Singapore, and as Forest Inspector in Selangor to 1901; collected forest trees in these places for Ridley.

GRIFFITH, William. (1810–1845).

Surgeon in the service of the East India Company; appointed civil surgeon of Malacca in 1841; recalled to take charge of the Botanic Gardens, Calcutta in 1842; returned in 1845. His herbarium is at Kew. (Dict. Nat. Biogr. 23, p. 240).

GWYNNE-VAUGHAN, David Thomas. (1871–1915).

Professor of Botany at Reading; in 1899 attached to the Skeat Expedition and from the southern Siamese Malay States travelled collecting towards Kelantan. His plants are at Kew and Cambridge. He numbered in the field. (Proc. Linn. Soc. London for 1915–1916, p. 61).

HAMID bin Mohd. Sah.

Forest Ranger. In Forest Department from 1907. Collected in many parts of the Peninsula.

HANIFF, Mohamed.

Entered the Gardens Department in 1890; and has collected in many parts of the Peninsula; later collections bear the "Singapore Field Number" series.

HASHIM bin Mohamed.

First in the Gardens Department and then Forest Ranger in the Forest Department, 1908– .

HAVILAND, George Darby. (1857–1901).

Surgeon and naturalist; resided at Singapore as Director of the Raffles Museum and visited the mouth of the Pahang river in 1890 and there collected. His Pahang collections are at Singapore. (Kew Bull. 1907, p. 197).

HAY, M. C.

In the Malayan Civil Service; stationed at Batu Pahat in 1924, when he collected economic specimens for the Singapore Gardens.

HENBREY, G. J.

Deputy Conservator of Forests, Federated Malay States, 1905– .

HENDERSON, Murray Ross.

In the Museums Department, Federated Malay States, 1921–1924; Curator of the Herbarium, Botanic Gardens, Singapore, 1924– . He numbered in the field.

HERVEY, Dudley Francis Amelius. (1849–1911).

In the Malayan Civil Service and Resident of Malacca (1882–1893), where he collected a herbarium which was given to Kew,

HILL, Henry Charles. (1852-1903).

Indian Forest Service, 1872-1903; Inspector General of Forests, India, 1900-1903; in 1899 deputed to report on the forests of the Malay Peninsula, for which purpose he travelled rapidly through the three Settlements in turn, then from the Dindings through Perak and Selangor, into Pahang via the Semangkok Pass to Kuala Lipis and down the Pahang river, thence to the Kuantan and Rompin rivers. Specimens gathered for identification were sent by him to Singapore.

HOBSON.

In the Survey Department; collected plants near Taiping and gave specimens to the Botanic Gardens, Singapore in 1909.

HOLMBERG, P. J.

In the Land Office, Malacca, and in 1891 in charge of the Malacca forests, when he collected forest trees for Ridley.

HOLTUM, Richard Eric.

Assistant Director of Gardens, Straits Settlements, 1922-; numbered in the "Singapore Field Number" series.

HOSE, E. S.

Son of the following; Malayan Civil Service, and from 1924-1925, Colonial Secretary, Straits Settlements; collected plants which are in the herbaria at Kew and Singapore.

HOSE, the Right Reverend George Frederick. (1838-1922).

Chaplain in Malacca, 1868-1873; in Singapore, 1874-1881; Bishop of Singapore and Sarawak, 1881-1908; collected plants, chiefly ferns; his collection of ferns is to be found at Kew. (Journ. Straits Br. Roy. As. Soc. 57, p. 1).

HOSE, Gertrude.

Daughter of the last named; collected grasses in various parts of the Peninsula.

HOSSEUS, C. Curt.

Traveller and collector; visited the Malay Peninsula in 1904 and collected plants, which presumably are conserved in the Botanic Gardens, Berlin.

HULLETT, Richard William. (1843-1914).

A schoolmaster in Singapore; a member of the Gardens Committee, and once in temporary control; collected a herbarium which he gave to the Gardens,

HUME, H. L.

Planter; attached to the Federated Malay States Museums during 1921, and collected plants in the neighbourhood of Kuala Lumpur.

HUNTER, Sir William. (1755-1812).

A ship's surgeon in the East, 1781, and in the employ of the East India Company, 1783-1812, and author of "Plants of Prince of Wales Island" printed in the Journ. Straits Branch, Roy. As. Soc. 53, p. 49. (Dict. Nat. Biogr. 28, p. 305).

ICHEBESTA, Rev. Father.

Missionary and linguist; collected some of the plants useful to the jungle folk of the Kedah-Perak boundary, for the Singapore Gardens, in 1924.

ISAAC, J. S.

A clerk in the Botanic Gardens, Singapore, who collected a little there under Ridley.

JACK, William. (1795-1822).

Surgeon in the employ of the East India Company and on the staff of Raffles; was in Penang and Singapore in 1819; his collections were lost in the "Fame," but he had sent duplicates of many to Wallich in Calcutta. (Journ. Straits Br. Roy. As. Soc. 73, 1916, p. 147).

JAGOR, F.

Traveller; author of "Singapore, Malacca, Java, Reiseskizze" 1866. He was for three months, April to July, 1858, in Malacca and for a much shorter time in Singapore. His collections are apparently conserved in Berlin.

JENSEN, Marius.

In 1901 collected plants in the neighbourhood of Singapore and Johore, which are preserved at Copenhagen.

JUPP.

Miner; climbed Gunong Stong in Kelantan and collected a few plants which he sent to Singapore.

KELSALL, Colonel J. H.

Royal Engineers; stationed as a Lieutenant in Singapore, whence he made several journeys of exploration, collecting plants for the Singapore Gardens.

KERR, Arthur Francis George.

Physician in the service of the Government of Siam, and in charge of the Botanical Section, Ministry of Commerce; collected in the Siamese Malay States, etc. He numbered partly in the field, partly after study.

KEUN, G. C.

Ranger in the Forest Department, 1906-1917.

KIAH bin Hadji Mohamed Salleh.

A plant collector employed in the Botanic Gardens, Singapore.

KING, Sir George. (1840-1909).

Superintendent of the Royal Botanic Gardens, Calcutta; sent in 1879 to Java in connection with cinchona culture; collected in Singapore, Johore, Malacca and Penang; plants at Calcutta. (Proc. Linn. Soc. London 1908-09, p. 42).

KINSEY, W. E.

Assistant and afterwards Deputy Conservator of Forests, Negri Sembilan (1907-); collected forest trees.

KLOSS, C. Boden.

In 1903 and 1907 on the staff of the Botanic Gardens, Singapore; then in the Museums Department, Federated Malay States; Director of Raffles Museum, 1923- ; collected plants in many places which are largely at Kew and also in the Singapore Herbarium.

KNIGHT, Valentine.

An assistant in the Raffles Museum, Singapore (1902-1922) who collected a little.

KUNSTLER, Hermann.

Collector employed by the Royal Botanic Gardens, Calcutta from 1880-1886 chiefly in Perak. Many of his plants are labelled "King's Collector." Some of his Kinta collections were mislabelled in Calcutta "Larut" and some of his 1886 collections were got in the State of Selangor, but mislabelled "Perak." He numbered after partial study.

KURZ, Sulpiz. (1833 ?-1878).

Employed by the Dutch Government in Java, and then (1864-1878) by the Government of India in the Botanic Gardens, Calcutta; in 1863 collected a little in Singapore. His collections are conserved in the Calcutta Gardens.

LAKE, Harry.

Miner and surveyor; explored Johore and with Kelsall in 1892 made a crossing of it from east to west, collecting on the way for the Singapore Gardens.

LEDoux, J. A.

Planter of Kota Tinggi, in Johore, from the neighbourhood of which he collected plants and sent them to the Singapore herbarium in 1910 and subsequently.

LEWIS, T.

Assistant Resident Councillor, Penang; a friend of Griffith to whom he sent plants from Penang.

LIM BOON KENG, the Hon'ble Dr.

A member of the Gardens Committee, Singapore, collected a little in Singapore.

LOBB, Thomas. (1820-1894).

Employed by the firm of Messrs. Veitch (1843-1860) to collect plants of horticultural value; collected also dried plants, but these, which were sold in sets after determination, often bear incorrect localities. It is thought that the majority of the Malayan plants were got in Penang. (*Hortus Veitchii*, p. 41).

LONG, F. R.

In charge of the Hill Garden, Taiping (1908-1910) and from the hills he sent a collection of plants to Singapore.

LOW, Sir Hugh.

Resident of Perak (1877-1889), during which period he collected a little, sending his plants to Kew, and he encouraged collecting by others. See *Agri. Bull., Straits and Federated Malay States*, Vol. 4, p. 239.

LOW, Lieutenant-Colonel James. (-1852).

In the Madras Army, and later in civil charge of Province Wellesley; author of "A Dissertation on the Soil and Agriculture of Penang." He collected a few plants which are at Kew. (*Dict. Nat. Biogr.* 34, p. 183).

MACHADO, Alfred Dent. (-1910).

Miner, then for a short time (1902-1903) on the staff of the Botanic Gardens, Singapore, and later a planter in Perak and again in Singapore. He made several small collections which are conserved at Singapore.

McGILL, Captain Hilton.

At sea, and later a planter in Kelantan (1904-1913), where he collected plants for Ridley.

McNAIR, Major John Frederick Adolphus. (-1910).

Colonial Engineer, Straits Settlements; author of a report on Singapore timbers; collected specimens of timber trees in Penang for Cantley, when, in 1881-1882, he was officiating as Lieutenant-Governor of Penang.

MAIN, T. Wilson.

In charge of the Hill Garden, Taiping in 1907 and Assistant Curator, Singapore Gardens, 1908-1910.

MAINGAY, Alexander Carroll. (1826-1869).

Army Surgeon, and from 1862-1867 in charge of the jail in Malacca, where he collected vigorously. His herbarium and notes on plants are at Kew. (Trans. Bot. Gard. Edinb. 11, p. 36).

"MAT."

A plant collector in Singapore (1888-1897), who visited Gunong Pulai and accompanied Becker up the Tahan river.

MATTHEW, Charles Geekie.

Fleet-Surgeon; visited the Straits Settlements in 1904 and 1913, and collected ferns.

MILLS, G. R.

Planter; sent plants to Singapore from Batu Gajah in 1925 and subsequently.

MILSUM, John Noel.

In the Agricultural Department (1914-); collected plants which are at Kew.

MITCHELL, A. S.

Extra Assistant Conservator of Forests, Federated Malay States, 1907- .

MITCHELL, F. J.

Ranger in the Forest Department (1915-1922).

MOHAMED NUR bin MOHAMED GHOSE.

Employed in the Botanic Gardens, Singapore from 1913; collected in many parts of the Peninsula.

MOLLER, Hjalmar.

Visited Java in 1897 and when returning to Europe in the month of September collected mosses in Singapore and Penang.

MOORHOUSE, S. W.

In the Forest Department, Negri Sembilan, 1903-190 . He collected rotans for the Singapore Herbarium.

MOTLEY, James.

A miner engaged in Borneo (1852-1859); found an opportunity of collecting a little in Singapore. E. Barbour acquired the collections which he made to 1854, and sent them to Kew. (Journ. Straits Branch Roy. As. Soc. 79, 1918, p. 37).

MURTON, Henry James.

Superintendent, Botanic Gardens, Singapore (1872-1882); collected vigorously and sent specimens to Kew, but destroyed what he had retained in Singapore.

NANSON, William.

A lawyer of Singapore; interested in orchids, specimens of which he supplied to the Singapore Gardens.

NAPIER, Sir Walter J.

A lawyer of Singapore and Attorney General (1908–1909); on the Gardens Committee; collected plants for the Gardens from different places.

NEAL, G. E.

In the Forest Department (1911–1924); collected specimens of forest trees in Pahang.

NEWBOLD, T. J.. ().

Of the Madras Army, author of "A Political and Statistical Account of the British Settlements in the Straits of Malacca," 1839; transmitted plants from the summit of Mt. Ophir to Wallich in Calcutta.

NGADIMAN bin HADJI ISMAIL.

A plant collector employed in 1924– in the Botanic Gardens, Singapore.

NINGHUL.

A collector employed by Griffith; the editor of Griffith's "Posthumous Papers," spelling the name in various ways, took it to be a place name.

NONGCHI.

Employed as a gardener by His Highness the Sultan of Johore; in 1892 sent plants to the Singapore Gardens.

NORRIS, Sir William.

Recorder of Penang; a friend of Griffith, to whom he sent plants. Griffith's herbarium came to Kew, and Norris' own fern collection also reached Kew.

O'HARA, G. M.

In the Forest Department (1905–).

O'HARA, V.

In the Forest Department (1912–1926).

OXLEY, Thomas.

Surgeon and finally Senior Surgeon in the Straits Settlements (–1857); interested in economic plants, especially in Gutta-percha trees. About 1843 he sent plants from Malacca to Voigt in Bengal, at the moment when the East India Company had ordered the construction of a new herbarium in the Calcutta Botanic Gardens, evidently to replace what Wallich had just dispersed. He was said to possess a herbarium of 1,000–1,200 specimens in 1845. He climbed Mount Ophir in January, 1839 or 1840, and again in 1848, and sent plants to Kew from 1848 to 1852.

PEARS, Francis.

A planter of Johore who collected a little in the Muar valley in 1899.

PENNEY, F. Gordon.

In the Malayan Civil Service (1876–1906 or 1907); sent Pahang plants to Singapore in 1902.

PERRY, G. E.

Sent plants to the Singapore Gardens in 1920.

PHILLIPS, P.

Deputy Conservator of Forests, Federated Malay States, 1896–1925, collected in Pahang.

PHILLIPS, William Edward. (–1850).

For a long time in the service of the East India Company in Penang, and from 1819–1826 Governor; collected plants and gave them to Wallich, and also gave a collection to the Horticultural Society in London, which was passed on to Kew. (*vide* Jour. Malayan Branch Roy. As. Soc. N.S. 1, 1923, p. 8).

PINWILL, W. S. C.

A correspondent of the Royal Botanic Gardens, Kew, who sent thither a few plants from Malacca.

PORTER, George.

A member of the gardening staff of the East India Company's Garden at Calcutta, who accompanied Wallich to Singapore in 1822 and elected to remain in Penang, where he became a schoolmaster, and was put in charge of a Botanic Garden; he collected and sent plants to Wallich.

RACIBORSKI, Maryan.

Professor and Director of the Botanic Gardens, Lemberg, Galicia; collected in Singapore in 1899 upon his way from Java and sent plants to Kew.

RIDLEY, Henry Nicholas.

Director of Gardens and Forests, Straits Settlements (1888–1900); Director of Gardens (1901–1912); did not number in the field, but upon study.

ROBERTSON-GLASGOW, Charles Ponsonby. (–about 1900).

Visited Singapore and Perak in 1898 and collected fungi chiefly, which were sent to Kew; but the greater part of his collection seems to have been lost upon his death.

ROBINSON, Herbert C.

In charge of the Museum, Kuala Lumpur, then Director of Museums, Federated Malay States (1909–1925), collected and organised collecting, sending his collections chiefly to Kew,

ROSTADOS, E.

Miner and planter; collected plants about Bundi in South Trengganu in 1904 and sent them to Singapore.

ROXBURGH, William.

A son of William Roxburgh, the first Superintendent of the East India Company's Botanic Garden in Calcutta; collected living and dried plants for his father, in Penang, in 1802.

SANDERSON, A. R.

Sent plants to the Singapore Gardens in 1920.

SANDS, William Norman.

In the Agricultural Department (1920-); gave specimens in 1924 to the Singapore Gardens.

SCHIFFNER, Prof. Victor.

Of the University of Vienna; collected mosses in Penang and Singapore in November 1893. (Ges. zur Forderung Deutsch. Wissensch., Mitt. II).

SCHLECHTER, Dr. Rudolf. (1872-1925).

Of Berlin; travelled through Malaysia in 1901 collecting in February, between Penang and Singapore.

SCHOMBURGK, Sir Robert Hermann. (1804-1864).

Appointed British Consul in Bangkok in 1857, and on the way thither collected plants in Singapore which were sent to Kew. (Dict. Nat. Biogr. 50, p. 437).

SCORTECHINI, Rev. Father Benedetto. (-1886).

A missionary who came to Taiping from Australia in 1882; he collected diligently until his death, but considerably neglected to label his specimens. The collection went to Calcutta. In several places his name is wrongly given as Bertold, as for instance in *Oberonia Bertoldi*, King. (Rev. Mycol. 9; 1887, p. 123).

[SCOTT, John. (1838 ?-1880).

Curator of the Royal Botanic Gardens, Calcutta, is credited in books with collecting in Penang; but probably what he did was to cultivate plants brought to Calcutta from Penang by T. Anderson and others].

SEIMUND, E.

In the Museums Department, Federated Malay States; collected plants for H. C. Robinson.

SKEAT, Walter.

Of the Malayan Civil Service; organised in 1899 a scientific expedition, which collected in the north of the Peninsula. The plants collected on the expedition are at Kew and Cambridge.

SMITH, Christopher. (-1806).

Employed by the East India Company to introduce valuable plants into Penang (1796-1806), and from Penang he sent plants to the Gardens in Calcutta.

SMITH, Mrs. (Dr. Eryl).

Wife of Dr. Malcolm Smith in the service of the Government of Siam; collected plants at Fraser Hill, upon the Main Range in 1922.

SOUTH, F. W.

Sent plants to the Singapore Gardens in 1920.

STEPHENS, Arthur Bligh. (1855-1909).

Planter and then Forest Officer, Perak, later called Deputy Conservator of Forests (1897-1909); collected forest trees in Perak.

STEVENS, Hrolf Vaughan. (-1897).

Ethnologist; collected specimens of the useful plants of the wild tribes in Trengganu, which are conserved in Singapore. (*Zeitschr. für Ethnologie*, 29, p. 235). See Wilkinson, *Papers on Malay Subjects*, Supplement (1910); *The Aboriginal Tribes*, pp. 3-5.

STOLICZKA, Ferdinand. (1838-1874).

Geologist in the employ of the Government of India; visited and collected in Penang and Singapore in August, 1869. (*Memoir in Scient. Res. Second Yarkand Mission*, 1886).

STRESEMANN, Dr. E.

A zoologist of the second Freiburger Molucca Expedition, 1910-1911, who took opportunity of visiting the main range of the Peninsula from Tapah and collected mosses.

T.....

The initials "G. T." (perhaps G. I.), together with the locality Singapore and the date December 1845, occur upon the label of a specimen in the herbarium of the Royal Botanic Gardens, Kew, to which has been added "G. Thomson." Who the collector was is unknown. Certainly it was not Dr. Gideow Thompson of Madras.

TASSIM DAUD.

Employed in the Singapore Gardens (1886-1895).

TENISON-WOODS, Rev. Julian Edmund.

A geologist, who visited Perak from Australia in 1884 and botanised with Scortechini.

VENNING, Alfred Reid. (-1908).

In the Malayan Civil Service (1893-1908); when Secretary to the Resident, Perak (1900-1903), residing in Taiping he collected plants which are conserved in Singapore.

VERAPHA.

A native collector employed by Griffith. The Editor of Griffith's "Posthumous Papers" mistook his name for a place name and spelled it in more than one way.

VESTERDAL, A. P. N.

Planter of southern Johore, where he collected plants and supplied specimens to the Singapore Herbarium in 1917. It is believed that he sent further collections to Copenhagen.

WALKER, Colonel George Warren. (-1844).

Collected in Penang and Singapore about 1837 plants which are at Kew and in the Natural History Museum, S. Kensington.

WALLACE, Alfred Russel. (1823-1913).

Naturalist; visited Singapore and Malacca in 1854, making zoological studies, and collected plants in connection therewith. He ascended Mount Ophir in July or August of that year. ("My Life," in two volumes, London, 1905).

WALLICH, Nathaniel. (1786-1854).

The second Superintendent of the East India Company's Botanic Garden in Calcutta (1815-1846); visited the Straits in 1822 and collected much in Singapore and a little in Penang. His collections were part of the Company's Herbarium distributed in 1828-1832. (Dict. Nat. Biogr. 59, p. 135).

WATSON, J. G.

At first in the Agricultural Department and then a Forest Officer in the Peninsula (1913-), in which capacity he collected in Johore and elsewhere.

WAWRA von FERNSEE, the Ritter Heinrich.

Surgeon in the Austrian Navy; travelled round the world in attendance upon two German princes and collected on brief visits to Singapore and Penang. His collections were listed in 1883-1888 in his "Itinera principum S. Coburgi, Die botanische Ausbeute von der Reisen ihrer Hoheiten der Prinzen von Sachsen-Coburg-Gotha."

WERNER, Dr. E.

Visited Penang in 1907 and a part of the mainland which he calls "the hills of the Sakai," collecting a few mosses.

WESTERHOUT (probably J. B., Assistant Resident of Malacca).

A friend of Griffith, who brought plants to him.

WHITE,.....

Chaplain of Singapore about 1841; collected plants and gave them to Cantor.

WIGHT.

A brother of the botanist, R. Wight. He visited Malacca and collected a few plants for him.

WILLIAMS, G.

Planter of Siliau in Negri Sembilan, where he studied orchids.

WINKLER, Hubert.

Professor of the University of Breslau; visited Singapore and Gunong Angsi in 1908, and collected plants which are preserved at Breslau.

WOLFERSTAN, Littleton Edward Pipe.

Of the Malayan Civil Service (1889-191); collected plants in the Dindings when stationed there in 1900.

WOOLDRIDGE, Theo. A.

Of Penang about 1893, collected living orchids through native agents.

WRAY, Leonard.

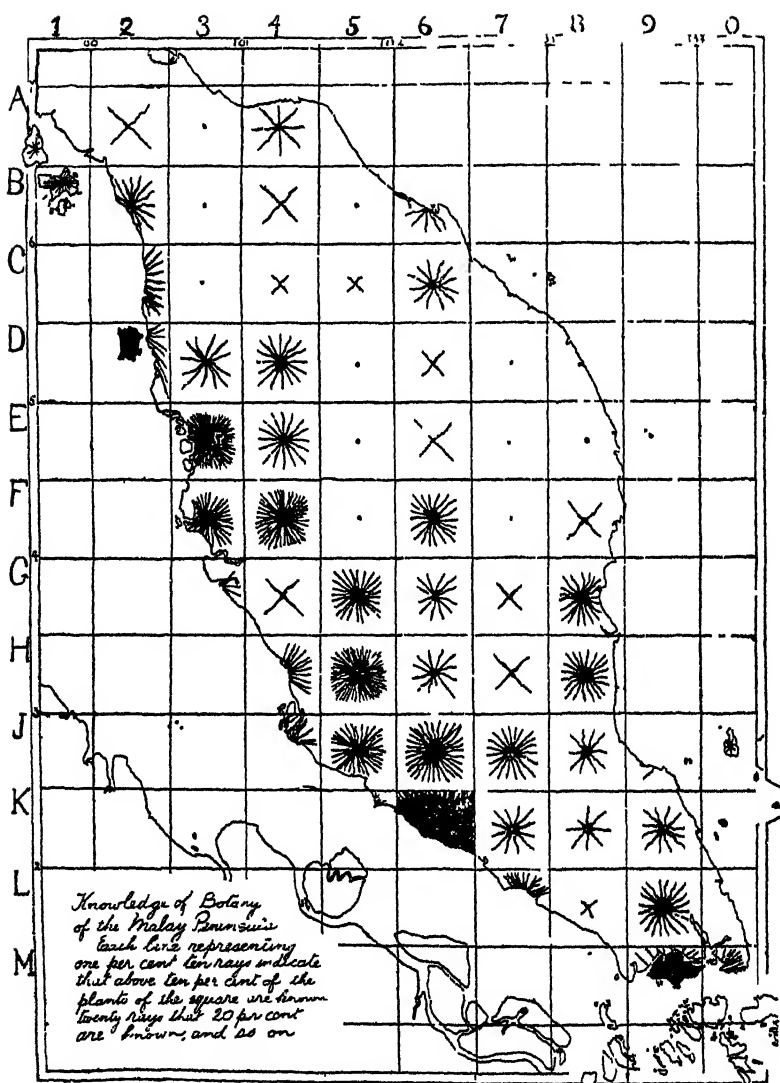
Superintendent of the Hill Garden, Taiping, 1881, and Curator of the Perak State Museum, 1883-1908, Director of Museums, Federated Malay States, 1905-1908; he made a considerable herbarium, which was worked up in Calcutta, where a complete set may be. The part he retained is now in Singapore. His father of the same baptismal name, resided in the Peninsula; therefore he commonly appended "junior" to his name.

YAPP, Richard Henry.

Professor of Botany, Birmingham University; in 1899 attached to the Skeat Expedition. His plants are at Kew and at Cambridge.

YEOB ABDUL RAHIM.

In Forest Department, Federated Malay States, and later in Johore. Collected extensively in various parts of the Peninsula, 1916-



•

THE COLLECTIONS.

A statement of the collecting done in all the parts
of the Malay Peninsula south of the seventh
degree north, considered by squares of
thirty minutes, as upon the
map preceding.

SQUARE 1a.

All the land in this square is Siamese, and is partly insular, partly peninsular. For convenience a liberty has been taken in extending the square westward a slight distance in order that all the islands of the Butang group should be brought within it. Thus extended it comprises from west to east Pulau Rawei, Pulau Adang, Pulau Tengah, the considerable Pulau Terutau, and many attendant islets; along with about 500 square miles of the Siamese administrative circle of Puket (State of Setul). It is recorded of this Siamese province that in 1780 it had ricefields back to twenty miles from the coast and plenty of cattle.

The western islands have been visited by one botanist only, and each for no more than a day or two. This was in the year 1911 when Ridley went successively to Pulau Rawei (April 20th-21st), Pulau Adang (April 21st), Pulau Nipis (April 22nd), and Pulau Tengah (April 23rd). An account of the visit is to be found in the Journal of the Straits Branch of the Royal Asiatic Society, No. 61, p. 45.

The island of Terutau has been visited several times. Curtis was there in the months of July and August, 1888, touching on this occasion only at Telok Wau (misprinted Noh) which is upon the south coast and for a few hours only (Rep. Forests, S.S. for 1888, appendix F). He visited Terutau again in July 1889 (Rep. Botanic Gardens for 1889, p. 18). In March, 1892 he reached Terutau for the third time, and in February, 1899, for the fourth. Then in November, 1901, he voyaged, as he records (Rep. Botanic Gardens for 1901, p. 21), fifteen miles further north than he had been upon any of the earlier expeditions, and visited the islet of Pulau Hujung Duri which is not remote from the Siamese coast of the Peninsula. In 1905 Fox visited Terutau, the month being October (Rep. Botanic Gardens for 1905 p. 9) and in 1906, in August, Mohamed Haniff was there. The last named was there again in 1915 on October 20th at Telok Udang. In November and again in December, 1916, Robinson touched the island at Telok Wau. In 1915 Haniff and Mohamed Nur on November 16th visited Telok Wau, and on November 19th, Telok Udang. All the visits have been short, often of only a few hours when the purpose was the obtaining of plants of horticultural value, such as *Impatiens mirabilis*: and the Botany is therefore very inadequately known.

The Botany of the mainland is altogether unknown.

The map prefixed to this report indicates that from among the Thalamiflorae-Calyciflorae we can attribute 73 species to the square against 205 from Langkawi and 796 for the square containing Penang. The number recorded for Penang suggests that only about one in ten or ten per cent.

of the plants native to the islands has as yet been collected in them. The outer islands have been visited in April only: Terutau has been visited in March, July, October and November: and except Pulau Hujong Duri, only on the southern coast where it can be reached easily by a short crossing from the bays of the north of Langkawi island. Timber working was commenced on Pulau Adang about 1900, but arrested by malaria.

SQUARE 2a.

This square contains almost its full complement of nearly 1,300 square miles, of land, most of it being Siamese, —part of the Siamese administrative circle of Puket: the rest is in the State of Perlis.

It contains the port of Setul to which Ridley went by sea in 1910, spending the days from March 10th to 16th there (*vide* Jour. Straits Branch Roy. Asiatic Soc., No. 59, p. 47). A year earlier Haniff had been there for living plants. Ridley's locality Bukit Raja Wang is near Setul, and he paid especial attention to such limestone hills in the neighbourhood as Batu Bunga, and Batu Berjongkong. Just previously, Ridley had entered the square from the south at Ginting Kabok on March 1st. In May 1919, Kerr on an enforced halt at Padang Besar collected a few plants.

The extent to which botanising has been done in the square is thus seen to be very small, and the months of the visits March and May, so that of plants vigorous during the rains there is no knowledge. The map shows a record of 53 species; and as the sum total existing must be in excess of what is found in Penang we appear to know only 5 per cent. of the plants of the square.

SQUARE 3a is in Siam and is quite unknown botanically. Parts of the Siamese Malay States of Sawngkla and Tapa enter into it.

SQUARE 4a.

This square is wholly Siamese. The land surface in it is of about 1,100 square miles, a little being in the Siamese Malay State of Tapa, within the Administrative Circle of Sritamarat, and the rest being in the States of Nawng-Chik, Tani, Jering, Jalor and Rahman, lying within the Administrative Circle of Pattani.

Gwynne-Vaughan and Annandale, with Skeat, collected at Tani town and Nawng-Chik on the lower Sungei Pattani in April and May, 1899, and then went south into the State of Jalor to Biserat and Jalor town, climbing Bukit Jalor and Bukit Besar (called by the Siamese Kala kiri) which reaches 3,000 feet, Bukit Tapang and the limestone hill of Bukit Gowa. Thence they went into square 4b.

In February 1916 Annandale revisited some of these places. Gwynne-Vaughan's collections were divided between Kew and Cambridge and his field notes are at Kew.

Kerr in July, 1923 travelled collecting through this square from north to south parallel to the Pattani river, and returned a month later down the river. In September, 1923, he collected on Bukit Besar.

Craib has published part of the results of Kerr's collecting in his *Florae Siamensis Enumeratio*; but the whole is not available yet. The names which it has been possible to collect for the purpose of the map which prefaces this report number 36 only. But with mountains rising to 3,000 feet, the number of species occurring in the square cannot be less than occur in Penang, and is probably more by several hundreds, so that making allowance for the unpublished *Disciflorae* and *Calyciflorae* of Kerr's collection, the percentage of *Phanerogams* collected in 4a may be estimated at eight. These have been collected in the months of February, April, July and August.

SQUARE 5a.

This is made up of parts of the Siamese Malay States of Jering, Sai and Rahman,—all within the Administrative Circle of Pattani.

Down collected a few plants in 1900 at the mouth of the Telubin river: and except for these, the botany of the square is wholly unknown.

SQUARE 1b.

This square is wholly insular, and consists as regards land of the Langkawi islands (Kedah State). There are but five miles of sea between the north coast of Langkawi proper, and the south coast of Terutau in square 1a. The mountain of Gunong Raya in Langkawi rises to 2,388 feet; and the islands are all very rugged, with limestone and granite formations intermixed. The islands had a considerable population prior to 1821, in which the Siamese laid them waste. Of recent years there has been considerable working of timber. Gunong Raya was visited by Curtis in February, 1890, and was climbed to the summit by Haniff and Mohamed Nur on November 13th, 1921. The list of botanical visits to Langkawi and the neighbouring islands is as follows:—

1888, Curtis in July spent four days at Kuala Malaka and Telaya Tujoh (Seven Wells).

1889, Curtis spent five days botanising on the islets.

1890, in February, Curtis, after collecting on the island of Dayang Bunting visited Langkawi proper and climbed

Gunong Raya and Gunong Chindrang. Dates upon herbarium labels indicate that he returned again in September for a few days.

1892, in April, Curtis spent a few days in the islands. One of the places visited upon this occasion was Pulau Nior Stali which is upon the south-west of Pulau Dayang Bunting.

1897, Ridley and Curtis visited Langkawi together in the month of February.

1899, in February, Curtis after a visit to Terutau in square 1a, returned to Kuala Kuah for a few days and botanised upon the islets within easy reach.

1900, Haniff spent a fortnight in Langkawi in September much handicapped in collecting by the weather.

1901, Curtis in the month of November spent three days in Langkawi proper. Again he visited Pulau Nior Stali.

1904, Fox in December visited Langkawi.

1905, Fox revisited Langkawi in October, and went forward to Terutau.

1906, Haniff visited Langkawi in August.

1911, Ridley in April collected for two days about Burau, Telaya Tujoh and Pulau Segai.

1914, Haniff in September visited the Langkawi group and collected at Tasek Enak, Telok Siun, Kuala Burau and on Pulau Lidi.

1916, Robinson and Seimund used the opportunity of a zoological expedition for collecting plants in November and December and into January 1917, chiefly on the island of Dayang Bunting.

1921, Haniff and Mohamed Nur from November 14th to 27th collected on Pulau Segai, Pulau Chupak, Pulau Ampak, Pulau Lidi, at Tasek Enak, Telok Siun, Kuala Burau, Telok Datai, Temoyang, Penarak, Bukit Selat Panchur, Tanjong Neru, Telok Apau, Goa Chirita and Ayer Hangat.

1925, Holttum in August collected on Pulau Langkawi and Pulau Dayang Bunting.

The list appears long: yet the total number of Thalamiflorae-Calyciflorae collected, as given on the map, is only 205. Now the Langkawi group cannot carry fewer species than Penang; and probably carries more on account of its varied rock formations. It is therefore estimated that in spite of the long list of visits we know not more than 25 per cent. of the plants which occur. The more effective botanisations have been done in the months of November and December: smaller collections have been made in February,

April, July, August and September. The limestone has perhaps received more attention than the other rock formations.

SQUARE 2b.

This square comprises the State of Perlis and a part of the State of Kedah, in all about 750 square miles. There is much rice-cultivation in it, a very large part of which is old. In 1821 the Siamese laid waste the land, and much went out of cultivation, to be resumed only after a considerable interval, but to be extended in no small measure during the last peaceful half-century. In 1821 Penang was dependent for its rice upon these Kedah fields, and suffered greatly in consequence of their devastation.

As the eastern margin of the square is east of the Alor Sta-Singgora road, all that has been collected along this road comes from within the square. Ridley having spent the period from February 23rd to 26th, 1910, about Alor Sta and on Bukit Pinang, traversed it on February 27th, proceeding to Perlis: Burkill and Haniff on March 19th, 1924 also collected along it, northward as far as Asun.

Ridley collected from February 27th to March 9th, 1910 round Kangsar, and particularly where limestone occurs in the neighbourhood, *e.g.* at Tebing Tinggi, Bukit Lagi and Bukit Besih Hangat; and he also collected at Bukit Telor Jambu and at Chupeng (*vide* Jour. Straits Branch, Roy. Asiatic Soc., No. 59, p. 27).

In the year 1881 in May Kunstler visited Kedah. It has never been quite clear to what places he went; but from the labels on his specimens it is clear that he reached the country from Penang and it would assuredly be by sea. Now among the specimens which he collected and labelled "Quedah" is a plant, which, strictly confined to limestone, can be got easily on Gunong Geriang near Alor Sta. These two observations leave the supposition that he went to Alor Sta quite probable.

The limestone hill just named was visited by Curtis for one day in 1889, and by Fox in 1904 (Report Botanic Gardens for 1904 where the name is misprinted Grenong), also by Ridley when at Alor Sta in 1910 and by Haniff in November 1914. Alor Sta was visited by Burkill and Haniff from March 16th to 20th, 1924, on which occasion collecting was done about Kuala Kedah, Anak Bukit, Kepala Batas, and Langgar. Haniff, who had collected at Alor Sta in November 1915, was there again in April, 1918 and April, 1924, each time for a few days. In November 1915 he proceeded from Alor Sta northwards to Bukit Wang and Jenum; and in March 1924, he visited Bukit Tunjang.

The result of this work, as far as the Thalamiflorae-Calyciflorae are concerned, is a list of 150 species, and as the square is likely to contain as many as square 2*d* (within which is Penang), it may be that 18 per cent. of the plants of it are recorded.

The vegetation of the rains is almost unknown; and except for Haniff's work the hills have not been explored.

SQUARE 3*b*.

This square is wholly of land, three quarters of it being in the State of Kedah, and the rest in the Siamese Malay States of Tepa and Jalor.

Except that Burkill and Haniff on March 17th, 1924, made an expedition from Alor Sta into the square nearly as far as Nerang, no collecting has been done in it.

SQUARE 4*b*.

This square is wholly of land. A very small part of it is in the State of Kedah: the rest is in the Siamese administrative circle of Pattani being parts of the Siamese Malay States of Jalor, Rahman and Legeh.

In April or May, 1899, Gwynne-Vaughan visited Kota Bahru and Bukit Sembilan near to it, both being in the State of Rahman; and thence they passed into square 5*b*. In July, 1923, Kerr traversed the square from north to south parallel to, and west of the Pattani river, and a month later descended the river. Kerr's collections are being worked out by Craib, and will increase the number of Species of Thalamiflorae-Calyciflorae recorded from the square to well above the figure of 27 as given on the map.

The square is full of high mountains and must possess a rich flora. If it is half as rich again as Penang and if the second part of Craib's *Florae Siamensis Enumeratio* doubles the figure on the map, then we know its Phanerogamic vegetation to the extent of upward of 5 per cent.

SQUARE 5*b*.

There are about 1,000 square miles of Siamese land in this square, being part of the Siamese Administrative Circle of Pattani, and of the States of Legeh and Sai.

In April or May, 1899, Gwynne-Vaughan visited Tremangan and Belimbing in the State of Legeh and collected a few plants. In July, 1923, Kerr collected for four or five days between Tanjong Mas and the Telubin river; Bukit Railway Station at which he collected is in this square.

On the map 11 plants are assigned to the square, the flora of which is thereby demonstrated as all but unknown.

SQUARE 6b.

This square contains only about 380 square miles of land, a small part of it being in Siam (Pattani circle), and the rest being in the plains around Kota Bahru in the State of Kelantan.

On August 24th, 1889, Ridley spent a few hours collecting at a place called Kamposa, which has ceased to exist; it was near to the mouth of the Kelantan river (see Jour. Straits Branch Roy. Asiatic Soc., No. 20, p. 87). The neighbourhood was revisited by him in 1917, when he stayed for a week at Kota Bahru. In 1899, Yapp, who had joined the Skeat expedition, collected about Kota Bahru between September 29th and October 10th, and he collected also at Kuala Essam which is close to the southern margin of the Square. Gimlette, during several years of work at Kota Bahru, commencing in 1909, collected plants with an economic interest. Bagan estate, where McGill collected, is on the right bank of the Kelantan river about twelve miles above Kota Bahru.

The species recorded for the square, which on account of cultivation has a flora poor in numbers, are as regards the Thalamiflorae-Calyciflorae 51, or perhaps upwards of five per cent.

SQUARE 2c.

There are only about 350 square miles of land in this square, consisting of the coast of Kedah from near Kota Sarang Semut to the coast of Province Wellesley near Ayer Tawar, with rice fields behind a large part of it, but with Kedah Peak or Gunong Jerai rising about midway between the north and south limits to 3,978 feet.

As in square 2b, so in this square the Siamese invasion of Kedah in 1821 sent most of the rice land to waste. It was recovered slowly, and enterprise in irrigation of latter years has extended it.

Thomas Lobb, Veitch's collector (there were two brothers of this surname who collected for that firm of horticulturists) climbed Kedah Peak in 1845 (see Hortus Veitchii, 1906, p. 42), and the dried plants obtained by him were named, made up into sets and sold; but the localities sadly intermixed before they were issued. Lieutenant-Colonel James Low, when in charge of Province Wellesley at some date before 1867 climbed the Peak and sent plants collected there to Kew. Sir Hugh Low, when Resident at Taiping, also climbed the Peak, taking with him Boxall, a collector for his family's firm of Hugh Low and Co. Early in 1876 Murton made an expedition to it. A report which he addressed upon his return to the Gardens Committee, Singapore, is no longer to be found; but in his report on the Government Botanic Gardens for 1876, it is referred

to and called an expedition "to Quedah, Penang and the neighbouring States." He sent the plants which he obtained to Kew; and it is evident that he reached the foot of Kedah Peak.

In 1893 Ridley landed at Yan and ascended the Peak from that village, remaining six days upon the mountain. The month of this journey was June.

In March, 1911, Bell and Haniff climbed the mountain from Gurun upon the landward side; and this line of ascent has now become the usual one.

In 1915 Robinson and Kloss collected 200 specimens in the months of November and December upon the upper part of the mountain. In the same year in November Haniff spent two days on it, again three days in August 1919, and two days in February, 1920. Holtum and Haniff in April, 1925 spent four days on it, collecting chiefly near the summit.

So much for the mountain: next for the plains. At Gurun, whence the road ascends Kedah Peak, Burkill and Haniff collected in transit in March, 1924, and at Kota Sarang Semut. Ridley collected at Yan on the expedition mentioned above, the month being June. When upon their way to Yan, driven by weather to take shelter, he and Curtis spent a day on Pulau Songsong: from Yan Curtis returned to Penang.

Finlayson in 1821 visited the Kuala Muda in January, and in the same month of the year 1918, Burkill collected down the south bank of the Muda river from Pinang Tunggal to Dusun Gajah. Burkill and Haniff visited Sungei Patani town in March, 1924.

The map shows only 142 species of the Thalamiflorae-Calyciflorae, against 796 for the square containing Penang island. Yet Kedah Peak, with a greater height than the highest of the hills in Penang island, should contain a richer flora. It seems possible that we know but 14 per cent. of the Phanerogamic plants of the square: and it is clear that much more attention should be directed to Kedah Peak.

SQUARE 3c.

This square consists entirely of land: and most of it is in the state of Kedah. Except that the road between Sungei Patani and Alor Sta for a short distance near Bedong runs within the western margin of the square and that Burkill and Haniff collected a few plants there in March, 1924; and but for the collecting by Father Ichebesta near Baling of a few plants economic to the Negritos, nothing whatsoever is known of the Botany of the square.

SQUARE 4c.

There is a small part of the State of Kedah within this square, a considerable part of the Siamese Malay State of Rahman, and a large part of the northern marches of Perak.

In January, 1922, Flippance collected a few plants near Klian Intan which is close to the western margin. Betong is not remote, but within Siam: and there Kerr collected both in August, 1923, and March, 1925. Kerr's August expedition ended on Gunong Ina also called Gunong Titi Pasah which is upon the Siam-Perak boundary.

The figure for this square upon the map is only 23: but this needs to be doubled in order to allow for the increment to our knowledge which will come when Craib publishes his further determinations of Kerr's plants. The square is one of mountains, and undoubtedly has a very rich flora. It contains a curiously abrupt and altogether unstudied peak in Gunong Kendronz. It also contains quite a considerable amount of deforested land. Probably our knowledge of its flora does not exceed four per cent.

SQUARE 5c.

One-third of this square is part of the Siamese Administrative Circle of Pattani being part of the State of Legeh the other two-thirds is part of the State of Perak.

In the years 1892 and 1893 Machado was employed at the Tomo Gold Mines, and around Tomo he collected plants which he sent to the Botanic Gardens, Singapore.

The square is one of mountains and dense forests with so rich a flora that Machado's contribution scarcely gives us knowledge of say two per cent. of the flora.

SQUARE 6c.

This square is almost entirely of land, and except for a small part of the State of Trengganu is in the State of Kelantan. The Kelantan river is formed just within its southern limit by the junction of the rivers Lebir and Galas. The name Lebir is here applied as upon the official maps.

Between 1903 and 1909 Gimlette was stationed at Kuala Lebir and there he collected economic plants which he sent to the Botanic Garden, Singapore (*e.g. vide* Report on the Gardens for 1904)..

In 1923 Haniff and Mohamed Nur ascended the Kelantan and Lebir rivers. Of their collecting places Riverside was reached on January 20th, and Kuala Krai on the next day. Kuala Krai is almost identical with Kuala Lebir. At Kuala Krai a halt was made of five days and Bukit Temangan was visited. Kuala Krai was revisited on the return journey upon February 14th.

The map shows 94 species for this square and judging thereby we can now record perhaps ten per cent. of the plants occurring in it.

SQUARE 7c.

This square consists of about 700 square miles of the State of Trengganu. Botanically it is entirely unknown.

SQUARE 8c.

In this square are about 30 square miles of the State of Trengganu and some islands including the island of Great Redang with Pulau Pinang sheltering under it.

These islands were visited by Yapp between October 14th and 19th, 1899, and the few plants collected in them are preserved at Kew.

SQUARE 2d.

This square contains the island of Penang, and, with it, the greater part of the Province Wellesley and a part of the Krian district of the State of Perak. Penang island has an area of 107 square miles and about 2,000 Phanerogams have been collected in it. The highest hill-top is 2,722 feet.

The island passed into the control of the Honourable East India Company in 1786, and was then wooded from shore to summits. Light and his company in three ships anchored at the point where Georgetown now is, and began clearing the woods of *Calophyllum* which was there: and this was followed by a kind of race for possession of the land behind: wherein "those who cleared the most.... were deemed the most meritorious." The progressive spread of this clearing is recorded in Logan's Journal No. 2, p. 174. Rapidly the land was denuded of its good timber back to the foot of the hills, all in the hope of great prosperity from its fertility; and in about 1800 a new town was planned called St. James' upon the Sungei Keluang which was to rival Georgetown or the original settlement. It failed, because the agricultural prosperity did not come at its making, and it had not the support of commerce.

War rendered a look-out on the hill-tops desirable; and therefore a road was made to what is now called Government hill, but then Flagstaff Hill. This road, finished in 1802 or 1803, made possible a considerable amount of destruction in the hill-forests. But it came slowly: indeed not in a great measure till the forests, when, what with charcoal burning and what with desultory pepper-growing, clearing extended to the very summits, provoking a protest which may be read in Logan's Journal, 2, p. 534. When the Straits Forest Department was created in 1883, the deterioration of the

timber-growth had become very marked. Even where extensive fellings did not occur, good timber was removed in such an excessive measure as to change the nature of the forest. Burn-Murdoch in his Annual Forest Administration Report for 1902 called attention to the still necessary need of letting the forests recuperate.

There is reason to believe that many plants common in Penang in 1786 are rare now in consequence of the change in the covering of the land, and that one or two, formerly present, no longer exist upon the island.

Christopher Smith was the first with any botanical knowledge to visit the island. He was employed by the East India Company to raise nutmegs, cloves and other spice trees in the Moluccas and to send them to Penang. When the young trees had arrived in considerable numbers, the Governor asked that Smith be sent to see to their planting and so he came to Penang in the year 1796: and from Penang sent plants of the island to Roxburgh in Calcutta. A collection of drawings which he made is in the British Museum of Natural History.

Roxburgh had another correspondent in Penang who had likewise been in the Moluccas. He is denoted in Roxburgh's *Hortus Bengalensis* by his initials,—H.C. And he had in 1802, a third,—his own son William, who in the months of May, June, July and August of that year collected dried plants, and sent or took them to Calcutta along with living plants for growth in the Company's garden.

In that year also, a surgeon upon the Madras staff, Sir William Hunter, found himself in Penang; and there he drew up an account of the plants of the island, which after remaining a century in manuscript in the British Museum, was printed in the *Journal of the Straits Branch of the Royal Asiatic Society*, No. 53, pp. 49–127. He too sent plants to Roxburgh. His often mentioned "Soongey Clooan" is the *Sungei Keluang* at Rihlau or St. James'.

In the year 1819 another surgeon in the Company's Service, William Jack in the train of Raffles reached Penang. He was there from December 31st, 1818 to May 22nd, 1819. His letters to Wallich in Calcutta, describing his botanising in Penang, were printed in the *Journal of the Straits Branch of the Royal Asiatic Society*, No. 73, pp. 151–238, and the plants which he is known to have collected are listed on pp. 241–268. Unfortunately he died young, and his valuable collections were burned in the destruction of the East-Indian "Fame."

In the end of 1821 a mission from India reached Penang upon its way to the further East; and as naturalist on this mission was the surgeon George Finlayson. From December 11th to January 5th of the next year Finlayson collected

in Penang: and the plants which he obtained went finally into the large East India herbarium distributed by Wallich between 1828 and 1832. Unfortunately it seems that some of Finlayson's specimens are mis-localised. Raffles edited his diary under the title "The mission to Siam and Hue in the years 1821-22" (London 1826).

Later in the latter year came to Penang Wallich, Roxburgh's successor as Superintendent of the Company's Garden in Culcutta, and with him was George Porter, head-overseer of the Garden, both seeking health. Wallich collected in Penang in the months of August and November, —in the first on the way to Singapore; in the second as he returned to Calcutta; but Porter elected to remain in the island, and was given a post of schoolmaster, together with, in 1823, the charge of a small experimental garden at Ayer Etam, not that once under Christopher Smith, but a plot nearby. Porter continued to collect for Wallich.

Wallich's and Porter's plants were distributed like Finlayson's between 1828 and 1832 by Wallich from London.

Over these years W. E. Phillips was Lieutenant-Governor of Penang. He put up and befriended Finlayson: he helped Wallich and doubtless brought about Porter's appointment. He collected plants himself, remitting them to Wallich and, it is said, later to Kew. In the year 1824 he presented a collection to the newly founded Horticultural Society of London, which perhaps represents his own herbarium: and these are now at Kew.

In 1830 Colonel George Warren Walker was stationed in Penang; and he collected plants. Between 1829 and 1832 Lady Dalhousie, wife of the 9th Earl, collected ferns in Penang for Sir William Hooker. In 1837 Gaudichaud upon his second voyage round the world touched at Penang. The voyage was conducted with great rapidity and Gaudichaud's opportunities for collecting were few: but one may be sure that he used them to the full. In 1845 on his way to Malacca Griffith spent in Penang the first few days of that year fatal to him and collected. He had two friends and correspondents in Penang who sent plants to him. One was Sir William Norris, the Recorder, the other the Assistant Resident Councillor, T. Lewis. The first named also sent plants to Kew.

In 1845 Thomas Lobb, who has been mentioned as having climbed Kedah Peak, collected in Penang. The remark already made in regard to the untrustworthiness of his localities unfortunately applies to his Penang plants, as to the others.

In 1857 the traveller Sir Robert Schomburgk was appointed British consul in Bangkok and on his voyage

thither he touched at and collected in Penang, sending his collections to Kew.

Between 1863 and 1868 Maingay, then Magistrate in charge of the Jail in Malacca found occasion to visit Penang and collected a little.

In 1873 Wawra spent a day or two in the month of February collecting in Penang. His collections are enumerated in his *Itinera principum S. Coburgi* (Vienna, 1883-1888).

In 1869 Stoliczka collected a few plants in the island.

In 1879 Sir George King upon his way between Calcutta and Java collected in Penang. This was in the months of August and November. After his return to Calcutta he engaged as a collector Kunstler; and we find that the latter was in Penang in April, 1881 and August and September, 1883. Hullett of the Education service in Singapore found an occasion of collecting in Penang.

In 1881 Major McNair, Colonial Engineer of the Straits Settlements, then acting Lieutenant-Governor of Penang, collected and sent to Cantley in Singapore specimens of the important timber trees of the island (Cantley's Report on the Forests of the Straits Settlements, appendix E, 1883).

The need of the forests brought about the continuous botanising of Penang under the administration of Cantley, Superintendent of the Botanic Gardens, Singapore. It was obviously impossible for Cantley from Singapore to supervise forest operations closely in Penang, and therefore as local forest officer Curtis was appointed with a considerable amount of independence from his superior. He reached Penang in July, 1884; and at once commenced to collect information upon the constitution of his forests, building up in Penang his own herbarium, while Cantley was building another in Singapore. He corresponded independently with Kew and with Calcutta, and produced in 1894 his "*Catalogue of the Flowering plants and Ferns growing wild in the island of Penang.*" But he also subsequently entered as regards the determination of herbarium material into close relations with Ridley.

Curtis used his subordinates for watching for the flowering of forest trees; and often his labels carry the information that a forest guard had brought the specimen in. J. Abrams was one of his subordinates.

The Penang herbarium for very sound administrative reasons was amalgamated with the Singapore herbarium in 1910.

Curtis left Penang in the year 1902; and was succeeded by Fox until 1910. Upon the Gardens staff under both and after both was Mohamed Haniff. Fox and Haniff have added

not a little to our knowledge of the island. Haniff's Mount Erskine is not the Mount Erskine of the maps, but Mount Olivia where Erskine once lived. In December, 1900, and forward to March, 1901, a traveller E. Deschamps visited Penang, and made a small collection of plants which was presented to the Royal Botanic Gardens, Calcutta. Visits of inspection took Ridley at intervals to Penang during the whole of his service; and more or less regular quarterly visits took Burkill from 1913 to 1924. They collected there and so also did Mohamed Nur of the staff of their department. Matthew in 1913 collected ferns in Penang. In addition several Forest Rangers have collected of recent years for the reference herbarium of the Conservator of Forests.

This completes the enumeration of botanists of Penang. The following paragraphs concern Province Wellesley.

It was in 1800 that Province Wellesley came under the administration of Penang, having at the time the scanty population of twenty souls per square mile, and therefore clad in forests. In the next year a Siamese invasion of Kedah gave it settlers, who, driven from their homes, cleared much of the northern part. This northern part differs from the southern in possessing many lines of sandy parallel sea-beaches which afforded excellent village sites; whereas the sea has had to be kept out by embankments from the lowlands of the southern parts. The north thus became settled by Malays, and rendered to Penang what Penang had hoped for before its acquisition, namely grazing lands and ricelands. Clearing therefore advanced in the northern half, back from the sea-front as far as the conditions extended of alternating old sea-beach and hollows, that is, of *permatang* and *sawah*. But the south of the Province passed into the hands of men with means enough to do the large drainage works demanded,—men who made sugar estates. Forest by these operations was pushed out of the square with which we are dealing; and when in 1883 Reserves were created in Province Wellesley, they were of necessity so far eastward as to be in square 3*d*. At that time an experimental plantation was made at Kubang Ulu (since 1923 in the charge of the Agricultural Department). The care of this plantation and of the forest reserves in square 3*d* frequently took Curtis and Ridley into the Province and inspection of coconut estates not infrequently took Burkill thither for a day at a time. In 1881 in April Kunstler paid a visit. Under these circumstances a fair amount of information has been gathered on the Higher plants. In the year 1894 Bishop Hose collected *Pteridophyta* which are now preserved at Kew.

The hill of Bukit Mertajam rises to 1,700 feet, and is within the square. It is interesting that it carries at least

one plant absent from Penang island. It was botanised on by Ridley in and by Burkill and Haniff on October 8th, 1922. But the area of forest left upon its top is small, and has been much cut over.

The small part of the district of Krian to the south of Province Wellesley, which lies within the limits of this square, has never been collected in.

The map which prefaces this report shows a record of 796 plants of the Thalamiflorae-Calyciflorae for the square; and experience teaches that very few are likely to be added. The square is therefore used as a standard to indicate how many species may be expected in an area of this latitude of about 600 square miles and rising to a little above 2,000 feet.

SQUARE 3d.

The half of this square is in the State of Perak, the rest in the State of Kedah and consisting of the eastern border of Province Wellesley towards Kedah. Within this eastern border is the Forest Reserve of Tasek Gelugor, now in the process of passing over to agricultural land, and there was the reserve at Ara Kudah, which was given over to agriculture in 1902. Visits to these two reserves took Cantley and Curtis into the square in November, 1885, and Curtis on many subsequent occasions, as well as Ridley and Burkill.

Expeditions just a little wider and so extending into the State of Kedah were made by Burkill to Lunas in December, 1913, Haniff to Kulim in June, 1917, Burkill and Haniff to near Padang Sarai in September, 1921; and further in 1910 Haniff visited Gunong Bongsu.

Northern Perak has received more attention. It happened that political events in 1879 caused the early opening up of the Selama district, and this opening up enabled the botanists encouraged by Sir Hugh Low to collect in it. One of these was Scortechini who has left a number of specimens labelled Ijok, and who, it seems also reached Gunong Inas, a mountain which rises to 5,898 feet. His locality quoted as Abu Selama appears to be rightly Ulu Selama.

Gunong Inas was reached by Wray in 1892 and by Yapp in 1899. Wray's visit was in the month of May, Yapp's in December. Both travelled by the Selama river. Yapp was at Selama village from November 27th to 29th, and on the upper part of the mountain from December 6th to 24th. In returning he collected at Sira Rimau on December 26th and to January 4th; and he also collected at a locality called "coffee plantation" which is between Sira Rimau and Selama. Northwards of Gunong Inas is Gunong Bintang

which exceeds 6,000 feet. It was visited by Kunstler in June, 1880, and by Kloss in June, 1917.

In the lowlands upon the southern limit of the square is the Pondok Tanjong Forest Reserve. Forest officers as Burn-Murdoch and Barnard have collected in it, and it was visited by Haniff and Burkill on March 25th, 1924. West of this is the developed agricultural area round Bagan Serai, botanically unknown except for a few plants collected by Burkill and Haniff in March, 1924.

The eastern slopes of the Bintang-Inas range come into the square, but are unknown except where in the extreme south-eastern corner of the square the Kuala Kangsar-Grik road passes through Durian Pipit and Kota Tampan and Lenggong. Ridley traversed this road in July 1909 and Burkill and Haniff in June 1924. At Lenggong are limestone cliffs whereupon Ahmed bin Hassan, Ridley's collector, obtained interesting plants (Journal of the Straits Branch of the Royal Asiatic Society, No. 57, p. 5).

The number of plants of the Thalamiflorae-Calyciflorae collected in the square, as the map shows, is 149, which seems to indicate that 12 per cent. of the flora is known. No part of the square is well known: and a full study of the mountains would have results of great interest.

SQUARE 4d.

Upper Perak makes the greater part of this square, in fact, except for an unknown bit of Pahang, the whole.

Wray was in Upper Perak in August 1885 when he visited the Kenering river, and in May of the year 1889. He was in Upper Perak again in 1905, collecting upon the Kenering River in the month of April. In he was on the Piah River.

In the year 1909 Robinson and Kloss made a zoological expedition to Temengor which is right in the centre of the square: and Ridley accompanied them. He reached Grik on July 4th and proceeded to Temengor by elephant, collected upon the Sungei Kertai and pushed up the Temengor river for a day's journey. After collecting diligently there but under considerable difficulties from the unhealthiness of the country he returned by river to Kuala Kendrong (not Kuala Kenering as is by inadvertence printed in the account of the expedition) and so to Grik again on July 29th. (Journ. Straits Branch, Roy. Asiatic Soc., No. 57, p. 5).

In 1924 Burkill and Haniff were at Grik from July 16th to 21st, collecting there, and also in coming and going at the following places along the road to Kuala Kangsar: Kenering, Lawin and Sungei Kulim.

It is important to observe that all the collecting in Upper Perak has been done over the months from April to July; and useful to recollect that over at least a part of this period there is a lull in the flowering of the vegetation which makes collecting relatively unremunerative. The count of the Thalamiflorae-Calyciflorae known from the square gives 179, which assuming that square 3*d.* and 4*d.* are equally rich gives 15 as the percentage that is known.

The climate and perhaps also past conditions encourage bamboos, which are rather conspicuously present in the wide forests.

SQUARE 5*d.*

This square is astride the Main Range and is half in the State of Perak and half in the State of Kelantan. No part of it is botanically known except the interesting mountain of Gunong Stong in Kelantan upon its eastern limit. Gunong Stong is of granite with a very abrupt cap of metamorphosed limestone.

Jupp climbed it in the month of 191 , and sent a few plants from the summit to Singapore. Mohamed Nur when accompanying Foxworthy from Kuala Lipis in Pahang to Kelantan in 1924, climbed it on March 5th to 7th. The small figure for the square given on the map shows that for every part of the square, not excluding Gunong Stong, there is an unworked field.

SQUARE 6*d.*

Except for the eastern edge which is in Trengganu, this square is in the State of Kelantan. It is made up of two valley-systems, that of the Galas river and that of the Lebir river, which will be considered in this order.

Galas valley.—Down collected a few plants upon a prospecting expedition up the Galas river. In 1924, between February 22nd and March 1st, Mohamed Nur, attached to that expedition of Foxworthy which is mentioned above, collected at a series of places down the course of the river, e.g., Kuala Sameh, Sungei Renong and Kuala Limau Nipis.

Lebir valley.—In 1899 when Skeat was making his attempt to ascend Gunong Tahan from the north (Journ. Federated Malay States Museums, 3, p. 77) Yapp accompanied him as far as Kuala Aring (where the Aring river enters the Lebir river), and remained at this place from August 16th to September, 26th, collecting. In 1917 for half the month of February, Ridley resided upon the Channing Estate, which is upon the last reaches of the Lebir river before its junction with the Galas. His locality Jeram Panjang is on the Lebir just above the estate. In 1923, Haniff and Mohamed Nur entered this square from the north on January 26th and collected up the river

successively at the following places: Kuala Endong, Temiang, Kuala Rek, Telok Lalu, Bukit Papan, Kampong Kobang, Kuala Relai, and Kampong Parit. They passed out of the square southwards on January 31st; but descended the river again ten days later.

The number of species of the Thalamiflorae-Calyciflorae recorded on the map is only 39, and except for the small collection of Yapp, all were got in January and February. The vegetation must be quite as rich in species as that of the last two squares and assuming the similarity, 39 may be considered as indicating a knowledge of two per cent.

SQUARE 7d.

This square is in the State of Trengganu and botanically unknown.

SQUARE 8d.

This square consists of rather over 400 square miles of the State of Trengganu. In it is Trengganu town. Thither Ridley was taken on August 22nd, 1889, and contrived to get one day's collecting on the Island of Pulau Ketam and near the town. (Journ. Straits Branch, Roy. Asiatic Soc., No. 20, p. 86). Yapp from October 11th to 13th, 1899 and from October 20th to November 4th was in Trengganu and collected near the town and at Kuala Ibar to the south of it. Holttum visited Trengganu town in May 1925, visiting the island of Pulau Kapas and ascending the river to Kuala Berang. The neighbourhood contains vastly deteriorated forests and shows a great deal of the interference of man. Of its flora our stock of knowledge is but very little; perhaps two per cent.

SQUARE 2e.

There are but 60 square miles of land in this square, being a small area of the State of Perak between Kuala Kurau and Kuala Gula. It consists of mangrove forest with rice land behind it; and without any doubt the number of species which can be found is a very small one. But as yet no plant is recorded, except generically.

SQUARE 3e.

There are nearly 1,200 square miles of land in this square, entirely in the State of Perak. The town of Taiping is almost central, and has been the place from which botanical exploration has been done.

As early as 1875 the Botanic Gardens, Singapore were in touch with officers interested in promoting agriculture from Taiping; and when in 1877 Sir Hugh Low was transferred from Borneo to serve as Resident at Taiping his interest in plants caused him to take every opportunity for furthering botanic exploration. In 1877 Murton was sent

to him that he might report upon the extensive damage that had been done in the State by Malays and more particularly by Dyaks exploiting its resources in gutta-percha. Reaching Taiping in October, he climbed the hills on the east of the town, and collected plants, mostly living, which were dispatched for cultivation to Singapore; then he crossed the Gapis pass and went to Kuala Kangsar, whence he proceeded on to the slopes of Gunong Bubu, climbing to the summit. He returned to Singapore in December, reporting on his tour in an account which was printed in the Government Gazette for February 22nd, 1878.

In this same year, the coffee-leaf disease extended so greatly its hold upon the plantations in Ceylon as to cause something approaching a panic, during which certain planters of enterprise removed to Perak in the hope of carrying on where the disease, which in Ceylon they could not avoid, had not spread. These men opened new land near the Gapis pass, where already the Government had established experimental plantations, in the Trong district, and in parts of Perak in square 4f. One of the earliest of these men was Sir Graeme H. D. Elphinstone, who collected plants a little near the Gapis pass in 1884 or the following years. In 1881 Sir Hugh Low himself collected specimens of forest trees, and sent them to Cantley who happened at the time to be at Kew. In 1882 Sir George King's collector Kunstler, who had a free hand so long as he did good work, established his centre at Taiping; and up to February 1886 he spent the major part of each year collecting from Taiping material to which he attached notes of considerable value. When Kunstler sent plants from Gopeng in square 4f, Larut labels were used for them, and this seems to have led to a few erroneous records for Larut. In the same year (1882) Scortechini proceeded to Taiping on a visit, which culminated only with his death in 1886. Scortechini neglected the labelling of his specimens and it is difficult to ascertain whither he travelled from Taiping. In March, 1883, Kunstler ascended Gunong Bubu to the summit. In 1884, in May, Scortechini did the same, accompanying Tenison-Woods, whose mission was geologic. There is an account of this ascent in the Journal of the Straits Branch of the Royal Asiatic Society, No. 14, p. 1, from which it is evident that it was made from the north-east side via Gunong Arang Para where the house known as the Hermitage was situated. On his labels Scortechini calls this hill Gunong Haram or Gunong Haram Para. Other labels upon Scortechini's plants show that, confining ourselves to localities within square 3e, he botanised about Batu Kurau, on Caulfield's hill, Ulu Kangsar and Kuala Kangsar.

From 1881 to 1908 Wray was stationed in or near Taiping, first as Superintendent of the Hill-gardens and then

as Curator of the Perak State Museum and as Director of Museums, Federated Malay States. He accumulated a considerable herbarium during this period, referring for naming his specimens to Sir George King in Calcutta. Naturally the greater part of what he gathered came from this square, and we find on his labels the names of places such as Tupai, Batu Tugoh, Kota or Kampong Kota, Simpang, Blanda Mabok, Matang, Trong, Changkat Jering, Bukit Gantang, Matang Jambu which are all relatively near to Taiping. Wray ascended Gunong Bubu in March, 1890.

It was in 1885 that Curtis found the first occasion for a visit into this square; then in company with Cantley in the month of January, he ascended Gunong Bubu, Gunong Pondok and the Taiping hills. What happened to the collection made is not clear, except that the living plants went into cultivation at Penang. Curtis visited Taiping again in September, 1889, in May, 1890, in October, 1892, in July, 1893, in June, 1897, in October, 1900, and in December, 1901—short visits all; but all used for the collecting of specimens. The visit of October 1900 is described in an appendix to the Annual Report on the Botanic Gardens for that year. In 1887 he visited Hermitage Hill, and then the Waterloo Estate and Kuala Kangsar, and returning cut a way from the Waterloo Estate to the top of the Taiping hills in three days (appendix to Forest Report for 1887, p. 9).

Ridley paid his first visit to Taiping in March, 1891. He was there again in February and March, 1892, and visited Kuala Kangsar. He was there afterwards in June, 1893, in December, 1902, February 1904, and August 1909. Collecting was done on these occasions upon the hills over the town.

A forest department was formed in Perak in 1897, and A. B. Stevens appointed in charge of it. He was succeeded in 1908 by Barnard. These collected forest trees in various places: and in more recent years other forest officers as Burn-Murdoch, Foxworthy, V. O'Hara, and Borges have done the same. Naturally the attention of forest officers is directed towards particular forests and in square 3e has been largely towards the coastal mangroves, to which the following names are given: Singa islands, Sungei Limau, Trong and Telok Kertang.

In or before 1889 Hervey collected a little in the neighbourhood of Taiping. In 1898 Robertson-Glasgow visited and collected on the Gapis pass. In 1899 in October Fox collected at Taiping. In the years 1899, 1900 and 1902 Derry who was stationed at Kuala Kangsar collected a little. In 1901 or 1902 Venning collected a little at Taiping.

In 1904 Bishop Hose and Miss Hose collected plants, chiefly grasses, about Taiping town. In 1905 Mrs. Bland stayed for a short time at Taiping and collected. Sir Walter

Napier did the same in 190 . In 1909 Kloss collected upon the hills during a visit paid in May, and in the same year Long, who was stationed there collected and sent to Kew a bundle of specimens. In 1911 James W. Anderson paid a visit to the Taiping hills and collected. In 1913 Matthew collected ferns at and near Taiping. Burkill found an opportunity of a few days collecting in July, 1913 at Kuala Kangsar, when plants were got as well at Lubok Merbau and with Haniff for a fortnight in February on the Taiping hills, and a few days on two separate occasions in June at Kuala Kangsar, when plants were got as well at Lubok Merbau and on the limestone cliffs of Gunong Pondok.

Haniff had been on the Taiping hills on several previous occasions: first he was there with Mohamed Nur in the month of February, 1917 for eight days. In May, 1917 he was at Taiping and at that Ayer Kuning which is near Taiping. In October, 1923 he ascended the Taiping hills. In May, 1924 he was at Taiping and at Batu Kurau, and he was at Kuala Kangsar both in September, 1924 and January, 1925. Kota Lama and Lubok Kerbau are localities which were visited upon these two occasions.

Henderson was stationed in Taiping from December, 1921 to March, 1923 and collected chiefly at low levels.

Burkill collected at Batu Hampar on the edge of the Dindings on March 3rd, 1914.

The neighbourhood of Taiping has been deemed sufficiently worked for a list to be prepared of its plants (Gardens Bulletin 3, p. 303). If the reader will turn to the map he will observe that 957 species of the Thalamiflorae-Calyciflorae are recorded for the square; most of these are from the hills over Taiping. This number is greater by 161 than the number for the square 2d, a circumstance which must be ascribed not to more thorough working, but to the greater elevation of the Taiping hills and to the greater variety of vegetation thus produced; for it is indubitable that Taiping is not so well worked as Penang: but thanks to Kunstler's long stay it has been worked in every season. An estimate of the percentage of the total number of Phanerogams now known to exist in the square must at present partake considerably of a guess, but is probably somewhere between 60 and 70. There are differences indicated between the east and west faces of the Taiping hills which require working out.

SQUARE 4e.

This square is astride the Main Range of the Peninsula, extending into the three states of Perak and Kelantan and Pahang. It is hilly throughout; but the higher hills have been little studied. The following statement commences

with collections made in the lower ground, and from the north proceeds southwards.

The Plus river which is upon the northern limit of the square was visited by Wray in November, 1905, and he states that he collected to the headwaters. Burn-Murdoch * collected a few plants in the Plus and Chior reserves in 1912; his Sungei Njing is in the first and his Gunong Berekeh is in the second. Salak was visited by Haniff and Mohamed Nur in December, 1920, and so also Sungei Siput for three days; and Burkill visited Sungei Siput for one day in September, 1920. Near to this place is the Kamuning estate which was visited by Curtis in July or August, 1898, and by Ridley in February, 1894; and where Machado lived for a short while, collecting a small number of specimens.

Ipoh was visited by Curtis in the last days of the year 1895, and in July, 1898, when he collected about the town and southwards towards to Menglembu. Ridley, taking leave in October, 1898, collected about Ipoh and to the summit of Gunong Keledang and at Telok Pinang. He was again at Ipoh in January, 1921. Burkill spent eleven days at Ipoh in August, 1916, July and November, 1917, and September, 1920, collecting upon all sides of the town and largely upon the limestone cliffs of Tambun and of Gunong Rapat and upon those close to Ipoh town; he also collected towards Lahat. Burkill and Haniff spent another five days at Ipoh in June, 1924, when collecting was done largely upon the limestone cliffs of Ampang.

Goldham, an educational officer, collected a few living plants about Ipoh which were examined by Ridley.

Sungei Raya is upon the southern limit of the square. At it Kunstler collected in October, 1880; and from it Burkill and Haniff in June, 1924, procured by the agency of a bomoh a small collection of medicinal plants.

In the square is Gunong Korbu, the second highest peak in the Malay Peninsula. It reaches 7,160 feet. It was ascended by Barnard and Haniff by way of the Korbu river and Gunong Yong Blar and Gunong Bal in the month of May, 1909; but the facilities for collecting were poor, the forest at the time also particularly flowerless. In 1914 Robinson stationed a party of Dyak collectors upon the mountain at 5,000 feet, who from the end of February to the end of March collected between 3,000 feet and the summit. (Journal of the Federated Malay States Museums, 6, p. 43).

The map shows for this square 195 plants of the Thalamiflorae-Calyciflorae. But the square cannot be less rich in species than square 3e; and if the estimate for 3e is right, then our knowledge of 4e is but 13 to 15 per cent.

* We have seen in herbaria these specimens mis-labelled "Selangor."

It is evident thus how little the expeditions to Gunong Korbu achieved in proportion to the work left for others—and Gunong Korbu is only one mountain of the many high ones in the square. Ridley collecting upon the lower hill of Gunong Keledang revealed several species of considerable interest.

SQUARE 5e.

This square is partly in the State of Kelantan and partly in the State of Pahang. Foxworthy's journey in February, 1924, from Kuala Lipis into Kelantan took him through the square; and Mohamed Nur who was attached to the expedition collected successively at Mesa, Bukit Jelatah, Goa Kechapi, Sungei Yu, Sungei Kaloh and Sungei Merapoh which are between the railway station of Chega Perah and the Kelantan boundary: then after that at Pulai, Kuala Kerteh, Batu Papan, Batu Bau, and Goa Panjang. No other collecting has been done in the square; and it must be stated of it that it is botanically almost unknown.

SQUARE 6e.

This square has in it, rather towards its southern limit, the mountain of Gunong Tahan, than which there is no higher in the Malay Peninsula. It reaches 7,186 feet. The boundary between the states of Kelantan and Pahang runs over it. Attempts have been made to climb it from the north, but no collecting was done on them. The credit of finding a way to the top, from the southern side, belongs to Robinson, who has had a part in all three collecting expeditions made to it.

In the year 1905 Wray and Robinson set out for Gunong Tahan in the month of May, and together reached the mid slopes, when Wray, by reason of illness was forced to return. Robinson continued and spent June and July collecting on the upper slopes (Journal of the Linnean Society of London, Botany, 38, p. 301). In 1911 Robinson and Kloss went together to the mountain and Ridley accompanied them. Reaching 3,000 feet on July 6th, collecting was commenced by Ridley and done in a remarkably complete way. The return was made in August (Journal of the Federated Malay States Museums, 6, p. 127). In 1922 Robinson, who had established a semi-permanent camp upon the mountain undertook to direct two of the staff of the Botanic Gardens Department upon it; and Haniff and Mohamed Nur proceeded thither. They collected for twelve days in June, demonstrating how very thoroughly Ridley had collected before them.

All these ascents of Gunong Tahan were made by the Teku river: and along it collecting has naturally been done.

Upon the north of Gunong Tahan in February, 1923, Haniff and Mohamed Nur collected along the course of the Lebir river at Kuala Pertang, Kelumpur, Kuala Bedong, Kuala Manis, Lala Terlong, and Bator Kelantan, on the 18th of February, 1924, Mohamed Nur collected at Goa Ninneh, which he reached from Pulai upon the upper course of the Galas river.

The map shows that only 126 species of the Thalamiflorae-Calyciflorae are known from the square. It is a small number, and possibly only five per cent. of the whole flora. It is disappointing that we know nothing of the plants of Gunong Tahan which do not flower in the months of June and July: in fact we know really very little of the flora of the mountain.

SQUARE 7e.

This square is distributed between the three States of Trengganu, Kelantan and Pahang. Botanically it is quite unknown.

SQUARE 8e.

There are about 1,200 square miles of land in this square, all in the State of Trengganu, and quite unknown botanically.

SQUARE 3f.

This square contains the west coast of the Peninsula from just north of the Bruas river to just beyond the Perak river. It is therefore partly in the Dindings, and mainly in the State of Perak. The land surface is about 900 square miles. The forests of the Dindings are but little disturbed and contain fine timber, while inland is the large Bruas or Blanja forest reserve.

The Dutch had a fort on Pangkor island for receiving tin, of which we are told that in 1688 it possessed not a yard of cultivation, but that the forest pressed upon it. (Dampier's Voyages, 2, 1699, p. 174). Then and afterwards ships would touch at the coast in its neighbourhood for refreshing—for water or for new masts and spars, etc.: and from his ship touching there on January 9th, 1822, for some simple need, Finlayson was able to collect a few plants. But after Finlayson no one botanised in the Dindings until the forest wealth was protected, except that Scortechini paid a short visit in July 1884.

On January 19th 1888 Curtis seems first to have commenced his charge: then he spent six days at Pangkor, about Lumut, Rajah Itam and elsewhere (S.S. Government Gazette in March, 1888). He was on Pangkor island, at Telok Sera, on the Bruas river, up to Pengkalan Bahru, at Tanjong Burong, on Gunong Tunggal, at Tanjong Hantu, Simpiti, Sungei Puyu, etc.,* between July 7th and 14th of

* Tanjong Gol is on certain records said to be in Perak: that is a mistake. It is the western end of Singapore Island.

the same year (Appendix to Forest Report for 1888). He was at Lumut again in November, 1889, and so on. Ridley and Curtis were together in the Dindings in February, 1892, and thence forward annually until 1900. In July of that year Hill and Curtis were together through the Dindings. After this date occurred Burn-Murdoch's visits to the Dindings and to the Bruas reserve. Burkill was at Lumut and at Pengkalan Bahru in the commencement of March, 1914.

Off the coast are the Sembilan Islands: they are all small. Ridley and Curtis visited them together in 1892; E. S. Hose visited them in 1918 and Kloss visited the largest of them, Pulau Rembia by name, in May, 1916. Seimund collected on Pulau Rembia in November, 1918, and on Pulau Lallang in November and December, 1925.

Telok Anson town is upon the very margin of the square. Kunstler collected a little at it when proceeding into the interior. Scortechini visited Telok Anson in August, 1886, and probably at other times. When stationed there, E. S. Hose collected in the countryside. In 1924 Haniff spent a week there in the end of September. The following localities near Telok Anson are upon their labels and within the square:—Kota Stia, Pulau Tiga and Pasir Panjang Ulu.

Largely as a result of collecting in the Dindings, the number of Thalamiflorae-Calyciflorae known from the square is, as recorded on the map, 288. The rest of the square has furnished little. It is not a mountainous square, and perhaps we can name 30 per cent. of the species occurring in it.

SQUARE 4f. *

This square contains the Kinta valley and the greater part of the Main Range to the east of it. The valley has suffered extensive degradation of its covering, both on account of clearing and on account of flooding by streams surcharged by silt. The change is not by any means all of the last half century, for Daly who surveyed it in 1874 has left it on record how relatively easy his work was on account of the removal of so much of the forest canopy. However, there are some extensive reserved forests within the square; and the mountains are densely forested.

Batu Gajah is close to the northern limit of the square, and from its neighbourhood Burkill and Haniff collected in the end of June, 1924. East of Batu Gajah and equally

* The locality "Limbo Hills" occurs in the Materials for a Flora of the Malay Peninsula. For it read limestone hills.

near to the northern margin of the square is the mining centre of Gopeng which place is connected by road southwards with Kuala Depang, Kampar and through Chanderiang with Tapah. These places received early attention when the courtly was opened up. In the year 1880, in the month of September, Kunstler went to Gopeng and remained there or near by at Kota Bahru and Kampar until the end of the year. The first European plantations were then being made on Gunong Bujong Malaka and about Kuala Depang.

In 1881, in November, Kunstler paid another visit to Gopeng, and he paid a third in 1883, spending then the months of June to August there. His locality Gunong Mesah is a hill a few miles to the south of Gopeng.

In April, 1885, Scortechini appears to have visited Gopeng. In July he returned to it again from Taiping and ascended the neighbouring parts of the Main Range. After that he was prostrated by fever, and took the voyage to Calcutta in a vain effort to shake it off. Discovering in Calcutta how extensive were Kunstler's collections, he agreed to pool his efforts at writing a flora with Sir George King's; but he died in the next year.

In August of the same year Kunstler worked in the Batang Padang district, and upon lower slopes of Gunong Batu Puteh.

Curtis made an extended journey in 1894, when having landed at Telok Anson on August 16th, he proceeded to Tapah, and thence (1) to Kalindi, four miles northward (2) to Kuala Depang, eighteen miles, and (3) collected on Gunong Bujong Malaka which is above it and (4) at Sungei Siput which is a mining village to the east, and (5) on Gunong Mesah. He returned to Telok Anson collecting upon the way in Kampar and Tapah (Gardens Report for 1894, Appendix). In the next year during the last ten days of the year he was back again at Kuala Depang, Gunong Bujong Malaka and Kampar (Gardens Report for 1895, Appendix B): and in 1898 he collected in August for a third time upon Gunong Bujong Malaka (Gardens Report for 1898, Appendix B). This hill was visited by Ridley in October, 1898. In April, 1925, Henderson visited the limestone hill Gunong Lanoh, near Gopeng.

In 1890 Wray organised a very extensive exploration upon the mountains east of Tapah. He set out from Telok Anson on June 6th for Tapah by road, and from Tapah went by river to Kuala Wok: from this spot he climbed Gunong Batu Puteh, and was back in Tapah on July 19th, whence he went to Chanderiang; but he returned to Tapah and spent August and half of September upon Gunong Batu Puteh. On October 5th he set out for Gunong Chunam Prah and Gunong Beremban from which he descended on the Pahang side of the Main Range into the watershed of a tributary

of the Jelei river; then he crossed Cameron's Plateau in a north-westerly direction reaching Gopeng on the 24th of the month, and from Gopeng his base at Tapah. This long expedition is described in the Journal of the Straits Branch of the Royal Asiatic Society, 21, p. 123. For the time being it seemed to exhaust interest in the region.

In 1908 Robinson and Kloss made a zoological expedition to the Plateau and Ridley accompanied them to botanise. November found Ridley at Tapah, where he collected for a fortnight, then he ascended to the Plateau and remained there for three weeks. He collected very largely upon a river called in the reports the Telom, but this instead of being the Telom of the official maps is the Sungei Bertam which only after a considerable course runs into the Telom. He collected also upon a Gunong Beremban which is not the "Gunong Brumber" (or G. Beremban) of Wray's expedition, though near it. The fact is that exact geography is an importation into these regions. The expedition is reported on in the Journal of the Federated Malay States Museums, 4, p. 1. Upon a second expedition into the Plateau, Robinson made notes upon the vegetation seen upon Gunong Terbakar (Journal of the Federated Malay States Museums, 10, p. 248). In June, 1923 Robinson paid a third visit and was accompanied by Henderson, and the latter returned thither in January, 1924, and again in November and December 1925.

Tapah was visited by Burkill and Haniff from June 27th to July 2nd, 1924, when collecting was done towards Jor, at Tapah Road and Temoh and Haniff returned to Jor between September 12th and 19th. After this he went to Telok Anson, where he was until September 30th, collecting within the square at such places as Bandar Telok Anson, Durian Sabatang, Sungei Tukang Sidin and Degong. Henderson spent a week at Jor, in May, 1923.

As a result of all this work, the number of Thalamiflorae-Calyciflorae recorded for the square upon the map is 608. The height of the mountains assures a far richer flora than Penang has, perhaps even a flora twice as numerous in species; and on this assumption it can be calculated that we know 35 to 40 per cent. of what occur. It is remarkable that all the collecting has been done in the second half of the year and in further work attention should be directed to the region in the first half.

SQUARE 5f.

This square is wholly in the State of Pahang. It consists of a mountainous and densely forested tract. The nomenclature of its rivers is peculiar; for the longest, the Telom, surrenders its name upon uniting with a much lesser stream, the Jelai, which in turn surrenders the name of Jelai in square 6f, to become the Pahang river.

Machado collected upon the Jelai in May, 1903. He had made an earlier expedition prospecting towards its head waters in 1900; but whether he collected then or was unable to do so is uncertain, and it is uncertain also if all the specimens labelled "Jelai" were gathered within this square or in 6f. He described the upper part of the stream in the Journal of the Straits Branch of the Royal Asiatic Society, 33, p. 263. His Sungei Cha-ang seems to be the Sungei Chelang of the official maps and his Sungei Betak the Sungei Betan.

In the south-western corner of the square is Benta, where Burkill and Haniff collected a little in November, 1924.

Botanically the square is almost unknown as the small number—6—recorded from it upon the map indicates.

SQUARE 6f.

This square is wholly in the State of Pahang. As the route by which Gunong Tahan has been reached is in it, and as Kuala Lipis is in it, rather more collecting has been done, than in the squares which border it.

In 1923 Machado collected a little about Kuala Lipis. In 1924 Burkill and Haniff spent a week in November there collecting about the station, at the much older centre of Penjom, at Chineras and Ulu Chineras and at Budu. The Benchah forest reserve is across the Lipis river from Penjom and has supplied specimens of forest trees to forest officers. And upon the same side of that river is the Sungei Cheka which has done the same.

A little further eastward the Tembeling river joins with the Jelai to make the Pahang river, and Kuala Tembeling has served as the base whence botanists have started for Gunong Tahan. The large and difficult expedition of Ridley, Davison and Kelsall towards Gunong Tahan, in 1891, collected about it. This expedition reached Kuala Tembeling on July, 12th, Pulau Manis upon the Tembeling river on the next day, Kuala Tahan on the day after; it was at Sungei Tenok from July 21st to August 8th (*vide* Appendix to Gardens Report for 1891, and the Transactions of the Linnean Society of London 3, p. 269). Collecting was done at a spot recorded as Khol. It did not pass northwards out of the square, but was driven back by difficulties along the Tahan river. Of the localities which appear upon the labels of specimens, it is believed that Pulau Kinchi is upon the Tembeling river, but none of the following can be placed:—Guai, Blay Manis, Pulau Tijau, Pulau Padang, Pulau Dato, Lubok Pelang, and Sungei Paut.

In 1893, Becher, who soon after lost his life in a flood of the Tahan river, collected a little about Kuala Tembeling.

The expeditions of Wray and Robinson and of Robinson, Kloss and Ridley to Gunong Tahan refrained from collecting plants on the Tembeling that the portorage of specimens collected further up might not be interfered with. The expedition of Haniff and Mohamed Nur to Gunong Tahan in June, 1922, collected a little on the return journey at this place. Their locality Kuala Manis appears to be the same as Ridley's Pulau Manis.

In November, 1924, Burkill and Haniff procured a small collection from Kuala Tembeling.

The number of the Thalamiflorae-Calyciflorae recorded from the square is 235. Assuming the square richer in species than Penang island, and nearly as rich as square 4*f*, it can be estimated from the figure 235, that we are able to record about 15 to 18 per cent.

SQUARE 7*f* is partly in the State of Pahang and partly in the State of Trengganu; and it is botanically terra incognita.

SQUARE 8*f*.

There are rather more than 1,050 square miles of land in this square, most of it in the State of Trengganu; but a very little in the State of Pahang.

On August 25th, 1889, Ridley was taken by His Excellency the Governor of the Straits Settlements to the mouth of the Cherating river, and had a few hours for collecting. In 1890 Vaughan Stevens in an attempt to study the Sakai tribes upon the Kemaman river collected specimens of plants economic to them. In 1904 Rostados sent to Singapore a collection from the mining centre of Bundi, which is on the upper Kemaman.

By means of these small collections the number of Thalamiflorae-Calyciflorae known from the square is found to be 42, which cannot be more than four per cent. of the number existing.

SQUARE 2*g* contains the islet of Pulau Jarak, visited on December 20th, 1904 by Robinson, and in November, 1919, and described in the Journal of the Federated Malay States Museums, 10, p. 259.

SQUARE 3*g*.

In this square are the lowlands from near the mouth of the Perak river to a point about midway between the mouths of the Bernam and Selangor rivers. The area of land is under 500 square miles, and the flora doubtless restricted. Low caused the river Bernam to be explored in 1879 and in 1885 Sir Frank Swettenham commenced his journey from sea to sea along it. In 1886 Kunstler was on it; but it is uncertain if he collected upon the lower reaches,

i.e. in the square. In 1924 Haniff collected from Telok Anson, at Rungkup, Utan Melintang, Bagan Datoh and Telok Bahru.

The number of Thalamiflorae-Calyciflorae thus made known is 22; and the percentage of the flora of the square which has been collected may be set down at about two.

SQUARE 4g.

This square consists very largely of low-lying land, and a little sea. The area of the land is about 1,160 square miles, roughly half in the State of Perak and half in the State of Selangor. There are important reserved forests in it, as Changkat Jong, Bikum, Trolak and Bukit Belata; and from them a little collecting has been done. Joining the Sungei Bidor near Changkat Jong is the Sungei Sungkai. In May, 1882 Kunstler was upon the Sungkai river; and in November, 1885 Curtis also; but the chief object of the latter appears to have been living plants, and the herbarium specimens resulting are few.

Considerably further south and nearer the Bernam river is the small hill of Changkat Mentri, which was visited by Kloss in September, 1918.

The figure on the map for the square is 51, and we are unable apparently to record a greater percentage of the flora than three.

SQUARE 5g.

This square consists of a section of the Main Range, extending into the three States of Perak, Pahang and Selangor. It has been the subject of considerable attention very largely because the Semangko pass rendered the higher parts of the hills accessible. Within Perak is the Behrang forest where forest officers have collected; and south of it is Tanjong Malim where Burkill and Haniff collected a little in July, 1924. It is suspected that the plants which Kunstler labelled "near the Bernam river" came from somewhere in the direction of Tanjong Malim.

In the Selangor part of the square is Kerling, near to which Goodenough collected in 1899 and north to Kuala Kubu whence the road over the Semangko pass climbs to the head of the Selangor river. In the year 1886 Kunstler removed himself from Taiping and collected until September in this square. His chief collecting place was Ulu Bubong, and the specimens which he got there are dated with the months of January, July, August and September. In July, August and September he visited the heads of other streams, namely the Bera and Kal. The latter is written Kol upon the official maps; and in March and April he had visited further the head of one of the two Kerling streams, presumably the larger which has its source almost under Fraser

Hill; and he visited also the head of the Selangor river itself. These specimens when they reached Calcutta were labelled Perak; but the valleys themselves are in the State of Selangor. His base, if on the Bernam river, would be on the present State-boundary. During the period when he was working these Selangor valleys he also went north into Perak, and collected in the Slim valley, plants which may have been got in this square or in square 5f. He has a locality "P.P." which has not been identified, but may be assigned from his dates to this square.

The path over the Semangko pass which gave place to the modern road was long called the "Pahang track" and this name appears on upon the labels of plants; for instance, Ridley in July, 1897 collected upon the Pahang track, and Curtis in 1902 and Machado in May, 1903. In February, 1904 Burn-Murdoch collected a few forest trees at the pass, and in August of the same year Ridley made a stay more extended than upon his previous journey, being joined by Hosseus. At this date there were mines known as the Simpang mines at the place upon the ridge now known as Fraser Hill or Bukit Fraser; and Ridley collected much about them. He was there again in April, 1911. In 1912 Burn-Murdoch again collected a little at the pass. In 1921 Cubitt did the same, reaching northwards to "Pine-tree hill." In October, 1921 Mrs. Ferguson-Davie collected at Fraser hill. In 1922 Burkill and Holttum spent half the month of September collecting there (Gardens' Bulletin, 3, p. 19). In 1923 between August 25th and September 18th Holttum, Henderson, Foxworthy and Mohamed Nur collected there.

Somewhat nearer to Kuala Kubu than the Semangko pass is Bukit Kutu, where Ridley collected in May and June, 1896.

The Semangko pass gives access to the Raub district of the State of Pahang. Around Raub Burkill and Haniff collected in November, 1924 from the 8th to the 15th, and they procured by the agency of *bomohs* economic plants from Batu Talam to the northward. The following localities near Raub appear upon their labels:—gorge of the Sungei Tras, the Simpam river, the Liang river (both visited where the Batu Talam road crosses them), Gali and Dong. Many of the Dong plants came from the Jahit-Rambei forest reserve.

To the east of Raub is the large Bilut forest reserve, where forest officers have collected a little.

On the Main Range below the middle of the square is Gunong Ulu Kali whence Burn-Murdoch procured plants.

At the southern limit of the square is Bentong. Foxworthy and Burkill visited this town on December 6th,

1922. Best visited it from June 12th to 17th, 1924 and Burkill and Haniff from November 12th to 17th, 1924. The following localities near Bentong are within the square:—Sungei Perting, Gunong Raja, Bukit Raka, as also any place stated to be on the north or west of Bentong town. The flora of the conglomerate hills near Bentong is certainly interesting; but Best's visit at an unfavourable season to Bukit Raka is the only attempt so far made at a study of it.

The figure for the square appearing on the map is 489; and it is estimated that this represents 30 to 35 per cent. The hill collections have almost all been made in the first nine months of the year; the collections from the low country to the eastward have been made in June and November.

SQUARE 6g.

This square is the square of the mountain of Benom. It is entirely in the State of Pahang. In 1900 it was required that a trigonometrical survey beacon should be placed upon the summit of Benom and Barnes, taking a plant collector with him, made the attempt to get it there. He started from Ulu Gali; but did not reach the summit by some three miles. From a subsidiary summit where he placed the beacon, and which he supposed to be Gunong Kluang Terbang, he brought back a collection of 122 specimens. In March, 1923, Evans reached the summit and collected, and in July and August, 1925, a Chinese collector of the Federated Malay States Museums made a collection near the summit.

Within the northern margin of the square runs the Benta-Jerantut road, along which on November 23rd, 1924, Burkill and Haniff collected a little, at the localities Tanjong Musa and Batu Balai. Then they collected also at Jerantut upon the two subsequent days and on December 12th. In March, 1923, Foxworthy and Henderson collected in the Temerloh district north of the Semantan river.

From north to south the Pahang river runs through this square; and it has been collected on at various places. Ridley collected considerably between July 7th and 9th, 1891, in the Pulau Tawar neighbourhood, at Pulau Tawar, Pulau Changei, and Tanjong Antan, which indeed are not remote from the new Jerantut ferry. Ridley's locality Kadondong is on Pulau Tawar. To the east of the river at a few miles from it are the limestone rocks of Kota Glanggi where Ridley collected in 1891, and Kota Tongkat where Evans collected in June, 1917. Evans also collected at Kuala Tekam near by.

Further down the river is Kuala Krau, and opposite are more limestone rocks, those of Gunong Sennyum at which Evans collected in June and July, 1917.

The Thalamiflorae-Calyciflorae known from the square are 130, or 8 to 10 per cent. of the probable total.

SQUARE 7g.

This square which is wholly in the State of Pahang is covered by vast forests, traversed by the Jerantut-Kuantan road. Burkill and Haniff collected a very few plants along this road on December 7th, 1924 at Ulu Tekam and Sungei Lepar. Its southern margin is touched by the Pahang river whereon at Kuala Luit Ridley collected in 1891.

The figure on the map for the Thalamiflorae-Calyciflorae is 25, and our knowledge may be two per cent.

SQUARE 8g.

There are about 1,000 square miles of the State of Pahang within this square, the interior being botanically unknown, but some collecting having been done on the coast from Kuantan northward, where it is bold and hilly.

There are extensive forest reserves in this area where forest officers have collected, *e.g.* Burn-Murdoch and more lately others. Between June 17th and 23rd, 1913, Burn-Murdoch collected at Bukit Gapis, Bukit Galing, Tanjong Api, Bukit Ubi and Tanjong Tembeling. Durnford sent orchids to Ridley from Kuantan in 1889. Burn-Murdoch has collected in the Baloh reserve. Burkill and Haniff were at Kuantan from December 3rd to 7th, 1924, collecting there, at Telok Sisik, Ayer Puteh, Beserah and Kuantan ferry.

At the very south of the square is the mouth of the Pahang river; and collecting done upon its north bank was done within the square. On August 19th to 21st, 1889 Ridley was at Kuala Pahang with His Excellency the then Governor of the Straits Settlements; Darat Selah is a locality of this visit. In 1890 he spent a fortnight in the month of May at Pekan, crossing over the river on occasions to the north bank where he visited Pramau, Jambu, Kuala Brawas and Tanjong Medang; and he visited Kuala Mahang, Tanjong Gajah Mati and Pulau Manis, which are a little inland. In 1891 he started for Gunong Tahan from Pekan, visiting Pulau Manis and Pulau Rumpit. In July, 1917, Evans collected a little at the mouth of the river.

The number of the Thalamiflorae-Calyciflorae recorded for the square on the map is 208; and it seems likely that this represents about twenty per cent.

SQUARE 4h.

There are within this square about 600 square miles of the State of Selangor, all low-lying and much of it cultivated. In the centre are vast swamps covered with timber, in which the Bukit Cheraka forest is reserved. To the north is the Rantau Panjang forest where Ridley and Burn-Murdoch collected in August, 1904. On its edge is Batang Berjuntai, another name which appears upon their

labels. Kloss collected a little at Rantau Panjang on July 28th, 1914. Ridley collected at Kuala Selangor and southwards to Klang in the month of June, 1896.

Port Swettenham is upon the southern margin: to it Burkill and Mohamed Nur have paid collecting visits in every month of the year except January. In some of these visits collecting was extended to Klang. There is a record of Bishop Hose collecting also at Port Swettenham in the month of

The flora is doubtless poor. The number of species of the *Thalamiflorae*-*Calyciflorae* collected in the square is only 58; and judged thereby we know not more than 12 per cent. of the plants occurring.

SQUARE 5h.

Kuala Lumpur is within this square, which extends from the State of Selangor across the Main Range into the State of Pahang. To Kuala Lumpur Ridley was sent in 1889 and there he collected plants. His Bukit Kuda of this trip is a spot where horses were changed on the way from Kuala Lumpur to Klang, and with horse transport the name has now gone. In 1890 he endeavoured to arrange that a native collector should be stationed there. To start the collector Curtis went thither, and collected a little; then he left the collector, who proved unsatisfactory and only worked through the month of May. Garawang is one of his collecting places.

In 1891 Kelsall went to Bukit Etam at the head of the Langat valley and brought back collections (*Journal of the Straits Branch, Royal Asiatic Society*, 33, p. 67).

In 1896 Ridley while inspecting forests between May 9th and June 11th, collected considerably about Rawang, Dusun Tua, Bukit Etam, Ginting Peras, Ginting Bidai, thus reaching the watershed (*Selangor Journal of September 4th, 1896*). Goodenough, a subordinate in the forest service, was transferred to Selangor in this year and continued during several years of work to collect, doing so at various places, such as Batu Caves, Rawang, Kuang and Kanching. In 1897, Ridley was again at Kuala Lumpur in the month of July and collected about Batu Caves; in 1899 he sent a plant collector thither and was himself there for a few days. He collected there again in August, 1898.

In the year 1905 Engler visited Kuala Lumpur. Such plants as he collected are without doubt conserved in the Botanic Gardens at Dahlem near Berlin.

In 1910 Burn-Murdoch procured specimens from Gunong Ulu Kali, and in 1912, using forest rangers, chiefly Hashim, he collected around Kuala Lumpur and sent the specimens to Kew.

In 1911, Robinson commenced to organise collecting on the Main Range above Kuala Lumpur with the object of working out the dispersal of Himalayo-Sondaic animals southwards along the hills; and with the same end in view he caused plants to be collected. He sent Dyak collectors first to the head of the Langat valley to Gunong Menuang Gasing or Bukit Nyor or Nerang in the end of May and they collected through June (Journ. of the F.M.S. Museums, 4, p. 235). In 1912 Kloss visited Ulu Langat, and went to Gunong Mengkuang Gasing (Journ. Linn. Soc. London, 41, p. 285). The plants collected were sent to Kew (Journ. of the F.M.S. Museums, 5, p. 28). Later the Dyaks were sent to Gunong Mengkuang Lebar which is not far from Gunong Ulu Kali where they collected through the months of January and February, 1913. Kloss in 1914 collected about Rawang. In March, 1915, Ridley, revisiting Kuala Lumpur was taken by Robinson in connection with these investigation to Ulu Gombak on the way to Ginting Sempah and to the quartzite ridge of Klang Gates. Upon a further visit in September, 1917, Ridley visited Ginting Sempah; and soon after Kloss collected upon the not remote pass of Ginting Bidai and again in Ulu Langat. In 1921 Ridley paid yet another visit to Kuala Lumpur, and collected again with Kloss and Milsum at Klang Gates in the month of January. The name Sungei Tua forest reserve indicates a corner of the extensive Gombak forest reserve. The Forest Department has collected in it. During 1921 Hume collected for the Federated Malay States Museums in the vicinity of Kuala Lumpur.

There is a small forest reserve in Kuala Lumpur itself, Weld's Hill, which has served many officers in the Forest Department as a place for studying plants. Its name occurs often upon labels. The Forest Department has also collected considerably around Kuala Lumpur, particularly since Foxworthy joined it in 1918. Sungei Buloh Forest Reserve and Kanching Forest Reserve in particular have supplied specimens.

The Sungei Buloh Forest Reserve is continuous with the Bukit Cheraka Forest Reserve towards Klang where Burkill has collected on odd days in March, June and October, 1922, in January and December, 1923, and in September, 1924. Burkill also collected near Kuala Lumpur upon different occasions, *e.g.* at Batu Caves in November, 1916, and in October, 1922, and elsewhere in February, 1919, and September, 1920. Foxworthy was at the Ginting Sempah in December, 1922, at Klang Gates and in the Sungei Buloh forest in December, 1923: and Mohamed Nur was in the Sungei Buloh forest in the same month, 1923. Burkill and Haniff collected a few plants about Serdang in November, 1924.

Matthew collected ferns near Kuala Lumpur in 1913. Sanderson collected Myxomycetes there, and Brooks fungi.

The road descending from the Ginting Sempah to Bentong is within the square all except its last few miles. Burkill and Haniff collected along it near the Benus river, in November, 1924; and also upon the first few miles of the Bentong-Kuala Pilah road.

A bit of the Negri Sembilan is in the square, but no one has ever botanised in it.

The map indicates that 576 plants of the Thalamiflorae-Calyciflorae have been collected in the square; and this figure suggests that we could authentically record rather over 50 per cent. of what occur.

SQUARE 6h.

This square is chiefly in Pahang; what is not is in the Negri Sembilan. The Bentong-Kuala Pilah road crosses the square and has been collected on by Best on July 14th, 1924. In November, 1924, Burkill and Haniff procured collections of economic plants from Karak and Pelangai (Manchis).

The Pahang river flows upon the east side of the square and near it are the townships of Semantan and Temerloh. Ridley, Davison and Kelsall passing along the river in 1891 collected near Temerloh or Kuala Semantan, Telok Malati, and at Jellam (?Jeram) Panjang to the south of it.

In 1913, Burn-Murdoch with the aid of a collector from the Botanic Gardens, Singapore, collected from Semantan and Temerloh down the river.

Under the direction of Kinsey forest trees have been collected in the reserves of the north-eastern part of the Negri Sembilan, such as Triang and Pasoh.

The figure that the square bears upon the map is 153. The collecting has been rather desultory and bearing in mind the certain richness of the flora, 153 indicates that not more than 15 per cent., and possibly only 12 per cent. of the plants occurring can be named.

SQUARE 7h.

This square is entirely in the State of Pahang; it has the Pahang river along its northern border, the marshes of the Bera river, and the forested hills from Gunong Chini southwards in the centre and south. Along the banks of the Pahang river where village succeeds village, taxonomic botanists have not been drawn to do any extensive collecting, and in reality they are little known. Ridley collected here and there along them in July, 1891, as at Kuala Bera (Kuala Brok on his labels), and Fox in 1893 travelled up

the river collecting at Gunong Chini in this square. In 1913 Burn-Murdoch travelled in the opposite direction collecting between June 9th and 14th, on Gunong Chini, at Kuala Bera, Lubok Paku and Bintang (Gardens Bulletin, 1, p. 310). In November, 1924, Burkill and Haniff reached the river at Lubok Paku, collected a little and left there for a few days a collector named Ngadiman.

Elsewhere the botany of the square is unknown.

The figure on the map is 43, and this suggests that our knowledge of the square amounts to less than three per cent.

SQUARE 8*h*.

There are rather less than 1,100 square miles in this square, all belonging to the State of Pahang. The Pahang river is upon the northern margin; swamp forest and forest on low hills covers the rest.

Kuala Lepar, where Burkill and Haniff collected a few plants in December, 1924, is on the river in the square. Pekan is in the square. As recorded under square 8*g*, Ridley visited Pekan for a few days in 1889, and for half a month in May, 1890, collecting considerably; but his localities are rarely to be found on the official maps and therefore an enumeration here will be useful. He visited Renchong, Kalambalai, Ayer Hitam, Pigang, Katapang, Bohie, Telok Malati, Pengkalan Kazai, Sungei Parit.

Haviland was at Pekan for a few days in 1890.

In 1891 Ridley, Davison and Kelsall started upon their journey to Gunong Tahan from Pekan, but did not collect much on the lower reaches then. In 1913 Burn-Murdoch collected a few plants there, and in 1917 Evans a few. In 1924 Burkill and Haniff spent the last week of November at Pekan in much rain, collecting as far as flooding permitted south and west of the town.

The number upon the map of Thalamiflorae-Calyciflorae is 145. The evenness of the surface of the land scarcely promises a large flora and it is possible that we know now eighteen or twenty per cent. of what occur.

SQUARE 3*j* contains the Aroa Islands which were visited by Robinson in August and September, 1906, (Journal of the Federated Malay States Museums, 2, p. 8, and 6, p. 253).

SQUARE 4*j*.

This square contains but 200 square miles of low-lying land in the State of Selangor, from Port Swettenham township southwards to Batu beyond Morib. The Telok Forest Reserve is within it, and was visited by Burkill on September 22nd, 1918, May 4th, 1919, March 6th and 13th, June 12th,

September 18th and 28th and December 7th, 1921. Collecting was done also between it and Port Swettenham on June 19th, 1913, March 25th, 1915, and August 13th, 1916.

The number of Thalamiflorae-Calyciflorae recorded for the square upon the map is 15 only; from which it is surmised that we can enumerate and authenticate the names of about six per cent. of the Phanerogams.

SQUARE 5j.

There are about 1,000 square miles of land in this square, partly in the State of Selangor, and partly in the Negri Sembilan. Very little collecting has been done in the Selangor part. Burkill and Haniff collected a few plants in November, 1924, at Kajang, and the Forest Department has collected a little in the Kalambau Forest Reserve. In the Bangi Forest Reserve, and about Bangi, which is in the Negri Sembilan, the Forest Department has collected also.

Of the little States of the Negri Sembilan, Sungei Ujong became accessible before any of the others, and in 1874 had a British officer at Seremban. In 1875 a rough survey of it was made; but it was not for another eleven years that any attempt was made to investigate its vegetation. The investigation was done under Cantley's orders, for he sent his collector Alvins to Seremban in 1885. Alvins passed through Rantau either in coming or in going, perhaps in both. Bukit Lasing at which he collected is a few miles to the south of Rantau. His localities Temiang and Kapayang are places close to Seremban. His Bukit Sutu has not been precisely identified, but there is only little doubt in regard to its identity with a hill over Setul. He passed northwards beyond Setul to Beranang which is upon the Selangor border. At this time a bridle path existed via Setul to Beranang, and a cart road was in course of construction from Seremban to the coffee plantations upon the Beremhan hills. It may be assumed that Alvins collected upon both. He collected at Pantai which is a little to the north of Seremban and on Gunong Beremban which is in square 6j. On some occasion he visited Cape Rachado; but probably from Malacca by sea. Finlayson touched in 1821 at Cape Rachado.

Burkill and Haniff collected at Mantin on November 30th, 1924.

In square 5j are many forest reserves at which forest officers have collected, chiefly the Senawang reserve, near Seremban, and the Sendayan reserve, a little farther away.

In 1922 Holttum collected about Seremban and in the Senawang Reserve.

The Bukit Tunggul Forest Reserve is in Selangor, but upon the boundary of the Negri Sembilan. In it forest

officers have collected, and in 1896 Ridley visited the neighbouring country between Kajang and Sepang, chiefly the Reko woods. In 1898 he visited Seremban in December, and collected there and at Perhantian Tinggi. At the same places Burkill and Haniff collected at the beginning of November, 1924. In 1920 Ridley visited Bukit Tangga from Seremban in the month of December; and on account of the number of new species brought thence Mohamed Nur was sent to the same place at the commencement of December, 1923.

Williams collected orchids near Siliu about 1915 to 1918 and Ridley in 1891 collected along the railway from Port Dickson to Kuala Sawar on the Linggi river through Sirusa and Siliu. Milsum also has collected at Port Dickson.

In the Singapore Herbarium are a few specimens collected near Port Dickson by William P. Handover, a planter of that neighbourhood.

Sungei Ujong offers an instance of an interesting change in population centres. It is apparently the case that Beranang was once far more important than it is now, but no one has as yet tried to indicate to what extent the Malays repressed the forest before Europeans were able to enter the country.

The square as the map shows is known to possess 119 species of Thalamiflorae-Calyciflorae. The square containing Malacca is known to possess 794, yet it is much more level than square 5j, and certainly poorer in species. It cannot be therefore that 5j is better known than ten per cent.

SQUARE 6j.

This square is wholly in the Negri Sembilan, with the town of Kuala Pilah almost at its centre. Its lower ground is considerably given over to agriculture; but it has wide forests over mountains reaching over 3,000 ft. The Rembau ricefields are old, and while that country under the hills shows very markedly that the woodlands between the fields are in an artificial condition; so too do the lower slopes of the mountains themselves, the forests having been greatly changed by removing timber. The Main Range of the Peninsula ends at the south margin of the square in Gunong Tampin.

Gunong Tampin may have been climbed by Alvins, who certainly worked for quite a long time close to its foot. He also reached Aver Kuning in 1884 from the Malacca side and no doubt it was easily accessible as mines were being worked at the time at Geminchih. In 1893 and 1894, Goodenough collected for Ridley on Gunong Tampin. In 1913 in the month of September, Robinson sent his Dyak

collectors to collect upon it (Journal Federated Malay States Museums, 5, p. 51) and visited it himself. In August, 1915, July and August, 1916, July and November, 1917, January and October, 1918, Burkill collected upon the slopes of it and to Kendong; and on May 1st, 1918, Foxworthy and Burkill botanised to the summit. Holttum likewise botanised to the summit in November, 1922. Ridley got nearly to the summit in 1917.

During the last week of November, 1922, Holttum collected in the Tebong Forest Reserve, at Selaru, Senaling, Kuala Pilah, Bukit Linggung and Ulu Bendol, whence he climbed Gunong Angsi. At exactly the same period of the year following Mohamed Nur, attached to a zoological party under Chasen, collected on this mountain over a fortnight. His locality Ulu Rembau is the headwaters of the Rembau stream upon Gunong Angsi. Fourteen years earlier, that was in 1908, Winkler collected on Gunong Angsi, collections of which presumably the first set is preserved at Breslau.

Moorhouse, Kinsey and other forest officers have collected in the forest reserves of Senaling Inas, Kepis, Bahau, Serting, and at the Bemban which is northward of the river Triang at Juasseh, in the Ulu Petasih which is near the Triang reserve, and about Durian Tawar.

In 1917 Ridley visited Johol and collected for a few days upon the river there called Sungei Jelei.

The result of this collecting is that 286 *Thalamiflorae*-*Calyciflorae* are recorded; which figure, taking Malacca as a standard, indicates that less than thirty per cent. of the flora of the square can be named.

SQUARE 7j.

This square is made up of parts of the States of Pahang, Johore and the Negri Sembilan. Botanically it is very little known. Genuang in Johore was visited by Ridley in March, 1915. Gemas upon the borders of the Negri Sembilan and Johore was visited by Burkill on November 2nd, 1918, February 27th and August 9th, 1919, and September 16th, 1920. The figure for the square on the map is 20 only.

SQUARE 8j.

The watershed of the Rompin river in Pahang makes a large part of this square; south of it a part of the State of Johore is included. In 1891, in the month of August, Lake made a hasty visit to the Endau river and climbed Gunong Janeng which is just within the square. It was not the first visit paid by a scientist to the mountain, as Mikluho Maclay had been there in 1875; but it led immediately to another: for returning with Kelsall in October, 1892, Lake proceeded to survey towards the south while

Kelsall went up Gunong Janeng and made botanical collections (Journal of the Straits Branch of the Royal Asiatic Society, 26, p. 3).

Evans in July, 1917, collected on the lower Rompin river as at Leban Chondong.

In 1922 the Forest Department carried out an extensive reconnaissance of the Rompin forests and collections of some extent were made.

The figure upon the map for the square is 101, and an estimate of the extent of our knowledge of the Phanerogamic flora works out at about 10 per cent.

SQUARE 9j.

The area of land in the square is small, being but little more than 200 square miles. It is parts of the States of Pahang and Johore near the mouth of the Endau river, and islands off the mouth.

Feilding visited the Endau river in October, 1892, with Lake and Kelsall. Evans visited it in August, 1917, collecting at Kampong Piangu. Foxworthy in May, 1918, visited Penyabong.

The figure upon the map is only 28.

SQUARE 0j.

The beautiful island of Tiuman is in the square, its mountains covering its whole surface and rising to 3,383 ft. There is little room for cultivation and a small population; so that its forests have not suffered disturbance. The Dutch boats proceeding to China and Japan used to touch at it for water or spars which they could draw unmolested; and in that way Kaempfer came to land upon it in 1690. He estimated its population as 1,000 (History of Japan, 1728, p. 61). It has been said that later when pirates used Pulau Aor extensively, they depopulated Pulau Tiuman; but this is to be doubted seeing how Pulau Tiuman is devoid of level land for agriculture.

In 1889 Ridley touched at Nipa Bay upon the west coast on August 18th. Nanson went thither for orchids which he cultivated. In 1915 Robinson went thither upon a zoological expedition and Burkill accompanied him. The interval from June 21st to 29th was spent at Joara Bay upon the east coast and the mountains ascended to 1,100 ft. Sungei Tawar and Sungei Bagu empty themselves into this bay. A visit was paid also to Tanjong Duatah on the south coast. In June, 1916, Kloss made another small collection from Pulau Tiuman which he sent to Kew.

As the Thalamiflorae-Calyciflorae number 62 and as the island must be richer in species than Penang, we appear to know less than eight per cent. of its flora.

SQUARE 5*k*.

This square contains only 60 square miles of land, being the area round Kuala Linggi, and northwards to beyond Cape Rachado (Tanjong Tuan). The Menyala Forest Reserve and the Pasir Panjang Forest Reserve are in it; in them and at Tanjong Agas Forest Officers have collected a very little. Alvins visited Cape Rachado.

SQUARE 6*k*.

Almost the whole of the Territory of Malacca is in this square: with it is a narrow margin of that part of the Negri Sembilan which lies just north of Malacca. Upon the east side a narrow strip of the Territory of Malacca is in square 7*k*.

The writer is inclined towards Dr. Winstedt's opinion in regard to the age of Malacca town. Dr. Winstedt has it that "Malacca existed as early as the 13th century A.D., and became a commercial centre about 1400 A.D. owing to immigration of Malays from Singapore or Tumasak—the sea country" (Journal of the Straits Branch of the Royal Asiatic Society, 1922, No. 86, p. 257). There is no reason for thinking that Malacca differed materially from the typical Malay state, which was founded by the ability of a party to extract revenue from the trade of a waterway: but in its case the waterway was an unusually large one, being the Straits of Malacca itself. For such a success men and resources were necessary; and it is clear that the immigrant element which brought the centre forward was, even if a fugitive element, one unbroken, and probably one quite friendly to the pre-existing element on which it grafted itself.

Taxation of the trade between India and Java furnished one part of the resources, but certainly not the whole, for commodities changed hands in Malacca, a merchant-population existing under the military population, and exploitation of the country behind was done. It would be gratifying to ascertain how great was the effect of this exploitation upon the vegetation: but the indications left to us are very meagre. The conclusions seem warranted that the ability of Malacca to levy duties indicates a largish population to be fed, which must have pressed upon the forest, and that the presence of the mart argues a certain amount of good government and security such as would aid it. But we have information in the Chinese work Ying-yai Sheng-lan of 1416 that rice being little grown was imported to feed the place: it was aided by some sago locally extracted: and in a list of vegetables, etc., which could be had in the town are named gourds, melons, mustard, and pepper, which may reasonably be considered imports like the rice: further, cattle, buffaloes, ducks,

fowls and goats were found only in small numbers. It may be taken as certain that Malacca did not feed itself from the land immediately behind it: instead from behind it, jungle produce as lignum aloes, dammar and ebony were drawn, and two tin mines were worked. The coconut-trunk, says this Chinese account, was split to make the floors of the houses: sugar-cane, plantains and the jak-fruit were to be had. These one regards as garden produce. Boat-building was an industry, the dammar used for caulking the seams; and much food was taken from the sea by fishermen who used dug-outs. Mats were made, doubtless by the women, and marketed: the Chinese account suggests that Nipa was used rather than Pandanus; and the Nipa would be got wild.

Thus we are brought to a conclusion that if the rice supply was certain, no more than gardens would be needed to add to it and the fish, upon which the town fed itself: but gardens on a fairly liberal scale.

Siam, after a long period of unchecked expansion southwards, at this time appears to have been able to extract tribute from Malacca, and Malacca to have thought it possible to assert itself against the demand. Then to avenge an affront, the Chinese Emperor Yong-lo sent a successful expedition against Siam and after it ordered Siam to keep its hands off Malacca, with which he entered into commercial relations a little closer; and Chinese merchants seem to have resided in Malacca, meeting there those who brought western calico, etc., from India.

A Chinese work, the Hsing-cha Sheng-lan of 1436, states that Pahang had much rice: and an account of Malacca in 1537 in another, the Hai-yu, states that Malacca got rice from three places, one being Siam, and another P'o-to-li, which is given elsewhere as in Pahang. As these Chinese works used older Chinese works for information without indicating what the older works were, the date at which the Chinese ascertained that Malacca was getting rice from Siam and Pahang is left uncertain: but it is a date apparently considerably prior to 1537, at which time the Portuguese were in Malacca, and to a date at which the Malays ruled in it. They, of course, were certainly in touch with Pahang, and that across country; so that the rice may have come overland: and if it did, the hold of Malacca upon its hinterland was stronger than outwardly appears. More cannot be said. The Malacca waters became unsafe for Chinese vessels next, and they ceased to venture up the Straits.

When the Portuguese, in 1511, had taken possession of Malacca they threw into the place three hundred of their countrymen, for whom they found native wives and

giving them lands and slaves, bade them raise a population favourable to Portugal. These lands, they tell us, extended from Cape Rachado to the Rio Formosa, that is Batu Pahat. It looks as if they were lands that had been settled by the Malays of the Malacca State—possibly lands considerably interrupted and spaced out by forest, but garden-lands contributing to the feeding of the town. The ousted Malays gave the Portuguese little peace; and as the colonists were liable to military service, they spent their lives under arms, living in the shadow of the fort in atap huts, instead of bringing into cultivation or maintaining under cultivation (whichever it might have been) the fiefs made over to them.

The Portuguese held Malacca for 130 years: and during that time they threw more and more men into the fort, so that Valentyn credited to it 11,000 to 12,000 souls. It is very significant that upon the Dutch victory of 1641, all that population, except 1,600, chose emigration to Negapatam, a hardship which they would not have consented to had they enjoyed prosperous possession of homesteads under cultivation. Thus was the Portuguese attempt at agriculture a failure; and it is quite likely that their occupation of Malacca undid a certain amount of clearing achieved by the Malays.

Afraid of the fort, but finding plenty of room at a fairly safe distance behind it, during the early days of the Dutch rule, colonies of Sumatran agriculturists moved up the Linggi river. These were the men who adhered to female succession of land, and the laws of Menangkabau; and who formed themselves into the States of Naning, Rembau, etc., expanding over a Sakai population. They spread ultimately towards Malacca as far as Rembia, where later they met the spread of agriculture with a male succession extending from Malacca. It is necessary to recognise in them a second centre of attack upon the virgin forests of the square: they passed eastwards over low undulations, using dry rice cultivation there, into the upper part of the Kesang valley, which was not country uninfluenced by Malacca, for mining, with the market for the metal in Malacca, kept a light touch on it.

About Malacca itself, the Dutch would have no rice grown: they had determined upon the artificial fostering of its production in Java, and forbade the raising of it at Malacca. This left no crops for the Malacca lands but garden crops: and the wastes could certainly not have been removed under the embargo. Dampier in 1688 wrote that rice was imported to feed the town, and the "country was all covered with wood like one forest." Valentyn wrote about 1720 that "except fish and some fruit.....everything has to be brought from other places" into Malacca fort.

However when subsequently the power of Achin and Johore waned, an experiment was tried with the lands which were given out (anew) at a very small rent on the understanding that they should be policed. But as they did not pay for policing, this measure did no good.

Konig, who paid three short visits to Malacca town then—one in September, 1778, the second in February, 1779, and the third, while waiting for a boat to India, from August 11th to December 15th, 1779 (*Journal of the Straits Branch of the Royal Asiatic Society*, 26, p. 100), records that forest commenced just beyond the village of Chang, i.e. at four miles from Malacca town. Another writer of the same period has left it on record that "the country was an impenetrable wilderness just beyond two miles from the Fort."

At the back of the wall of forest which had grown up round Malacca, an independent development went on slowly; and the district of Naning was cultivated in the Malay way, with fingers of rice along the valleys, villages on their edges and buffaloes, and with also a certain amount of dry rice growing for which forest was burned. When the power of Malacca was strong enough, Naning sent a tribute of rice thither: when it was possible it defied both Portuguese and Dutch. Behind the forest also in the same period, Malays worked gold mines at the foot of Mount Ophir, and on finding gold also at Geminchih worked mines there from about 1760. In 1793 tin-mines were opened at Kesang. As the demand for the tin and the gold came from oversea, and as Malacca controlled the sea, these mines kept open ways to the town, which were but the narrowest tracks supplementing the Malacca river.

From the strict Dutch rule, Malacca passed into British control in 1795: and as the paragraphs above show, it was at the time no more than a fort upon the narrows of the Straits of Malacca. Britain did two things, (1) removed the embargo on growing rice, and (2) removed the fortifications. It passed back to the Dutch in 1822, useless except as a pawn for bargaining in treaty making.

During the short Dutch rule which followed, Finlayson visited it. This was in 1822 and this is what he records:—"It is half-dead" with "every third house shut up," the country not raising rice enough even with it so for its consumption. The Dutch surrendered it finally to Britain in 1825; and it was put under the administration of Penang.

Of Malacca it was written five years later that its rice-fields then reached to Rumbia at a distance ten miles on the way to Naning; and there the track plunged into forest. Again five years later as a consequence of defiance from Naning a punitive expedition advanced along the

track, its history throwing a most instructive light upon the density of the barrier of forest which Portuguese and Dutch rule had caused to grow up.

The expedition started from Malacca town for Alor Gajah, and as soon as the forest was entered found its way obstructed by felled trees and its flanks harried by its enemy in such a measure that it was deemed necessary for protection to cut a wide strip right through the forest. It was a tedious business, and the little affair advanced at the slow rate of only twelve miles in one hundred and fifteen days at the cost of one hundred thousand pounds sterling.

Griffith in 1841 or 1842 made a journey to Naning along the road that the expedition had left and found it bordered by a belt of secondary jungle one hundred yards deep on either hand.

In 1848 Balestier recorded that Malacca still produced nothing but a little rice. In 1862 Cavanagh ordered that roads should be opened to the boundaries of the Territory: and in the seventies it suddenly awoke to a great agricultural activity. Owing to the lateness of this activity, in 1883, when a Forest Department was created, the forests were found richer in timber than those of Penang and Singapore.

No Dutch botanists studied plants in Malacca unless Couperus' tract on Gambier be counted. The study of its vegetation commenced as soon as British rule came in.

There were two William Farquhars connected with Malacca during the first period of British rule. One was there as a Colonel and the other as a Major. The Major interested himself in Natural History and employed a Chinese artist to depict the plants which he found. These drawings he submitted to Jack in Penang and later to Wallich in Singapore. Jack criticised them as wanting in detail. Their fate is unrecorded. But Farquhar climbed Mount Ophir at some date before 1819, and brought back plants thence among which was the curious fern *Matonia pectinata*: to Jack he gave his specimen and Jack sent it to Wallich. It was in 1822, when he had become the first Resident of Singapore that Farquhar submitted his drawing of the plant to Wallich.

On January 14th, 1822, Finlayson reached Malacca and collected for a week. The plants then got passed into the East India house, and were distributed by Wallich between 1828 and 1832.

Gaudichaud in 1837 upon his second voyage round the world collected at Malacca: but the voyage, the purpose of which was to drop consular officers at a number of ports, was done with great haste, so that he could not collect much.

Cuming, who spent the years 1835 to 1839 upon a great collecting expedition to the Philippines islands, in the last year visited Malacca in order to go to Mount Ophir. In what month has not been ascertained.

In 1841 Griffith was appointed surgeon at Malacca and applied his tremendous energy to collecting: but he had not been long at the station when Wallich was taken ill, and in consequence he was called to Calcutta to take charge of the Company's Garden. During this period of his service he visited Mount Ophir, passing to reach it through Rim; there is an Ayer Panas near this route: but he visited also the Ayer Panas which is north of Alor Gajah. He engaged a Portuguese of Malacca named Fernandez as collector, and left him at work while he was acting for Wallich. He returned to Malacca in January, 1845, only to die a month after his arrival. His copious notes, often only in pencil, and his specimens, were bequeathed to the Company, and the notes were published as Posthumous Papers under the editing of McClelland, who clearly had in doing this a difficult task. From them it appears that Griffith himself, except in making the two expeditions as stated above, did not get far afield from Malacca town. Tanjong Kling, Kamuning, Cheng, Pringgit, Malim, Batu Berendam, Pulau Panjang, Pulau Java, and Pulau Besar, are localities recognisable in his notes and so recorded as if he himself visited them: they are all close to the town. After his return in 1845 in the short month left to him, he employed two native collectors whose names are variously spelled in the Posthumous Papers. One, apparently was a native of southern India with the name of Verapha; the name of the other was spelled by Griffith Nhingghull. The latter collected for Griffith about Alor Gajah and forwards to Tebong. In the Posthumous Papers the names of these men sometimes appear as if place names. "Tanjong" in these Papers appears to stand for Tanjong Kling; and the Ayer Panas mentioned is possibly in all cases that north of Alor Gajah.

Griffith's friend Westerhout brought plants to him from Keru between Ayer Panas and Tebong. Another friend, Sir William Norris, brought plants to him from Mount Ophir.

In 1845 Thomas Lobb who has been mentioned as having collected in Penang, collected also in Malacca.

In 1858 Jagor voyaged to Java, and upon the way stayed in Malacca from April to July. He made the journey through the forest belt to Ayer Panas north of Alor Gajah, via Ching and Rumbia, and he records that forest commenced near Rumbia about ten miles from Malacca. He also ascended the Linggi river for a short distance (Reis-eskizze, 1886).

The next of the Malacca botanists was Maingay. Having accompanied the 1860 expedition to China, he on his return westwards became magistrate in charge of the Jail in Malacca; and over the years from 1862 to 1868 he collected and studied the flora very diligently, leaving a large herbarium and five note books on it, when in 1869 he was shot down in a mutiny in Rangoon. The herbarium and the notes are preserved at Kew; but by the phytogeographer it is to be regretted that he rarely recorded the places whence his specimens came.

In 1877 there was a resident in Malacca, a W. S. C. Pinwill who sent Pteridophytes to Kew. In 1879 Sir George King paid a short visit in the month of November. In 1882 Cantley commenced his study of the forests of Malacca, with the object of organising a forest department; and in 1884, the better to ascertain the composition of them he stationed there a collector named Alvins, who sent numbered plants to him in Singapore in bundles as they were prepared and dried. He is recorded as having sent about one thousand before the year was out and is recorded as having sent 1,840 in the year 1885. By the use of the numbers it is possible in a great measure to trace Alvins' collecting places. The first seem to have been in the two forests nearest to the coast, namely the reserves of Sungei Udang and Merlimau: then he moved to the more inland forests around Selandar. He collected at a Bukit Danan, which has not been identified, between two periods at Selandar: some labels (not Alvins', but those additional labels which were attached in Singapore) state it to be in the State of Sungei Ujong, but not all; and because it is known that some of these additional labels are misleading (see Ridley in Gardens Report for 1889, p. 7) there is much probability that the Bukit Danan visited by Alvins is in eastern Malacca. When the numbering had reached the neighbourhood of 760, Alvins removed to the Naning corner of Malacca and his labels bear the names of Chinana Puteh, Bukit Naning, Bukit Klana, Bukit Kandong, Bukit Payong, Gaong Talan (possibly under Gunong Tampin), Bukit Dusun Paya, and Bukit Bertam, being places close to the limits of Malacca territory in the direction of the Negri Sembilan, or perhaps some just over the border in them. Unnumbered plants, probably gathered earlier than this, bear the names of Bukit Bruang, Pulau Nangka, Pulau Dodol, and other places near Malacca town, and Bukit Panchor. When he had collected considerably in Naning, he was sent into the State of Sungei Ujong as related under square 5j. But later still he worked in the square 7k upon the eastern border of Malacca territory, though not wholly, for the names of Merlimau and Bukit Kajang occur; and he seems to have reached Ayer Kuning in Negri Sembilan towards Geminchih.

Upon early labels the names of Bukit Kayu Arang and Bukit Terbakar are found: the first¹ was in the Sungei Udang forest reserve, the second in the Brisu forest. He also labelled plants with the name of Bukit Putus, apparently indicating the hill of that name north of Brisu.

It was decided in 1886 to appoint an officer from Europe to take charge of the Malacca forests under Cantley, and Derry was selected. He served in Malacca from August of that year to 1893 collecting plants, chiefly the larger forest trees, in various parts of his charge, and had headquarters at Ayer Kroh upon the edge of the Bukit Bruang Forest Reserve, except that through 1891 his presence was required in Penang, and Holmberg held charge. In 1893 and 1894 Goodenough took charge of the forest.

Feilding when he visited Malacca and Muar in 1892 appears to have gone to the foot of Mount Ophir and to have collected at the Lubok Kadondong there.

Harvey was Resident-Councillor of Malacca from 1882 to 1894 and made a herbarium of Malacca plants, which was given to Kew at his death: he also sent plants both to the Botanic Gardens, Calcutta, and to Singapore. His specimens are not precisely localised.

In 1889 Ridley paid his first visit to Malacca, and another in 1890 and others at intervals afterwards, the last being in 1917. Upon one occasion he visited Kuala Pedas in Negri Sembilan, and upon the last the neighbourhood of Tampin. In 1892 Curtis visited Malacca, and again in May, 1900, and in April, 1901, both brief visits. Hullett also visited Malacca in December, 1883, and in April, 1888, in order to climb Mount Ophir.

Between 1914 and 1924 administrative work took Burkill for short visits in every month of the year except September and to every part of the Territory. Collecting was done as occasion offered, and the localities were numerous, so numerous that as no names were used which are not on the maps, they will not be given. In November, 1922, Holtum collected in the Bukit Sedanan forest reserve and about Tampin.

Malacca has thus been very extensively examined and it is thought that a list of the plants occurring within this square might be made ninety-six per cent. complete. It has been botanised in every part of the year. Its surface offers interesting studies in what man in such a climate as it has can produce, and in plant-successions.

* The *Diospyros* trees which gave the hill its name were removed in 1883.

SQUARE 7k.

There is a narrow strip of Malacca territory on the western side of this square, which eastwardly extends into the States of Negri Sembilan and Johore. Mount Ophir is in the square and the greater part of the basin of the Muar river. The total land surface is about 1,200 square miles.

Naturally Mount Ophir has attracted botanists to it. Farquhar collected on it about 1818. Someone a little later supplied Mount Ophir plants to Robert Wight who himself never visited Malaya but was in service in Southern India upon the Madras Establishment. Newbold in April, 1833, ascended Mount Ophir from Asahan, and collected a few botanic specimens upon the summit which he sent to Wallich in Calcutta (Newbold's British Settlements in Malacca, 2, pp. 165-174, and Journal of the Asiatic Society, 1834, p. 48). In 1839 Cuming climbed it. In January, 1840, and again in April, 1848, Oxley climbed it. In Logan's Journal, 6, p. 636, is an account of the first of these ascents. We are told that then the virgin forest commenced at Rim; and that the gold mines, which had shortly before been destroyed, lay in a pocket amid the forest at the foot of the mountain. The ascent was by a Padang Batu—probably the well known one which many travellers have mentioned. In February, 1842, Griffith visited the mountain, not only ascending to the highest summit, but seeking plants upon the slopes of the subsidiary Gunong Mering. Oxley's second visit is the next historically, and as a result of it he sent plants to Kew. In 1853 an ascent was made by (Sir) T(homas) Braddell in the company of a botanist; but it is not known who this was. The ascent is described in Logan's Journal, 7, p. 73. In the year 1864 and again in August, 1867, Maingay climbed the mountain. There is an account of an ascent in the Singapore Free Press of March 10th, 1864. At that time the village of Asahan was unoccupied.

Cantley is said to have acquired plants from Mount Ophir, but it is not clear by what means, though his collector Alvins was at Chabau towards the end of his time. Hullett climbed the mountain in December, 1883, and in April, 1888; and subsequently gave his collections to the Botanic Gardens, Singapore. Derry climbed it in May, 1890, which month he remarks is not in a flowering season (Report on the Botanic Gardens and Forest Department for 1890, p. 22). Hervey and Ridley climbed Gunong Mering together in 1892 and in 1898 Ridley took leave in the month of December to climb Mount Ophir again. Bukit Kavara and Sungei Pauh are two contiguous localities on this trip. His Botany of Mount Ophir is in the Journal of the Straits Branch of the Royal Asiatic Society, No. 35, p. 1.

The Kesang river flows from the foot of Mount Ophir to the Straits of Malacca, and in its valley Burkill has collected upon several occasions about Chabau, Chinchin and in the State of Johore towards the Muar river. Lubok Kadondong and Rihlau are by its headwaters. Feilding was sent in 1892 to the foot of Mount Ophir to Lubok Kadondong.

In April, 1901, Curtis ascended the Muar river to Biawak.

In spite of these many visits to Mount Ophir, the botany of the square is very little known, so that there are only 150 species of the *Thalamiflorae-Calyciflorae* to be recorded as yet for it as against 794 for square 6*k*. Now with so high a mountain in it as Mount Ophir the flora must be more than half as rich again as that of square 6*k*; and on that assumption our knowledge of it appears to stand at only twelve per cent. It is certain that Mount Ophir deserves more attention.

SQUARE 8*k*.

This square is entirely in the State of Johore and botanically it is very little known.

In 1892 Lake and Kelsall crossed a part of the square, having ascended the eastward flowing Sungei Sembrong, and the Sungei Kahang, they got into the westward flowing Sungei Sembrong and so to Batu Pahat. Their locality Simpai or Kampong Simpai is in the square close to the course of the railway, upon the eastern Sungei Sembrong. Sungei Malati is not remote.

In November, 1900, Ridley ascended the Simpang Kanan river from Batu Pahat as far as one of the very numerous *Tebing Tinggis* that exist. It is assumed that he had entered this square then.

In 1922 between November 15th and 20th Holttum collected in the square about Kluang, climbing Gunong Lambak. In 1923 Watson made a track to the summit of Gunong Belumut from the direction of Kluang, and in May, 1923, Holttum was at Kluang again and proceeded to Gunong Belumut in square 9*k* over Watson's track.

Down in 190 collected on the Bekok river, probably upon the part of the river near to the railway line.

The species of the *Thalamiflorae-Calyciflorae* known, as the map shows, amount to only 54, which may indicate a knowledge of about six per cent. of the total flora.

SQUARE 9*k*.

This square is entirely in the State of Johore, and contains Gunong Belumut. The land surface is about 1,080 square miles.

Gunong Belumut was climbed by Hervey in 1879, but it is not known what plants he collected upon it, though he recorded that he brought some down. Lake and Kelsall in 1893 mapped the Sungei Kahang and the Sungei Madek, and collected in the Ulu Kahang.

Belumut was botanised on by Holttum between May 23rd and June 1st, 1923. Watson shortly before had cut a trail from the Kluang-Mersing road to the summit, and had collected a little. This trail Holttum followed; it took him via Ulu Madek and Gunong Chemondong; he returned by Gunong Berchuak, Ulu Kahang and Gunong Beridong.

The species of the Thalamiflorae-Calyciflorae collected within the square and identified are 117 and judging therefrom the botany of it is about twelve per cent. known.

SQUARE 0k.

Some 35 square miles of the Peninsula, being part of the State of Johore are within the square, and various small islands, of which Pulau Tinggi is the largest. Pulau Aor has been squeezed into the square, so as to avoid having to make a new index number for it.

Pulau Aor used to be a pirate haunt, a mart for the slaves that they took; and it invited a considerable population which has tilled it to the summits. Koenig in 1778 visited it, and found it thus well inhabited. In 1849 J. T. Thomson, the Government Surveyor employed in Singapore described it in Logan's Journal. Nestling close under it is Pulau Dayang.

Feilding in October, 1892, visited successively Pulau Tinggi, Pulau Aor and Pulau Dayang. Burkill in 1915 accompanied Robinson to Pulau Tinggi and spent the period from June 16th to the 20th there; but failed to reach the top of the mountain which gives to it its name. Robinson and Knight during the same period visited the islet of Pulau Sanggul or Tokong Sanggul which is immediately to the south of Pulau Tinggi.

The map shows that 53 species of the Thalamiflorae-Calyciflorae are recorded, and as the flora of the area is probably less by one third than that of Penang, it seems as if we can name ten per cent.

SQUARE 7l.

There are only about 220 square miles of land in this square, being the coast of the State of Johore near Batu Pahat and the lower parts of the two rivers which converge upon it. There are low hills and swamp lands in the square.

Feilding visited Parit Jawa and Bukit Muar which are in the square in 1892 and Lake and Kelsall in the month of August collected a little near Batu Pahat town: and in the same year Nongchi sent orchids from the neighbourhood

to Ridley. In 1900 Ridley was at Batu Pahat town from October 31st to November 18th; and Machado with him. The following are collecting places visited then:—Gunong Banang, Gunong Penggaram, Bukit Soga, Patani Ketchil, Hadji Senawi, and the headland of Batu Pahat. From Batu Pahat town or Bandar Penggaram Ridley ascended the Sungei Simpang Kanan (Report Bot. Gardens for 1900, p. 5). In November, 1924, at the end of the month, Burkill and Haniff visited Batu Pahat town.

The map indicates 70 as the number of the Thalami-florae-Calyciflorae known from the square; and as the flora cannot be a very rich one, we probably know 10 to 15 per cent. of it. It will be observed that collecting has only been done towards the end of the year.

SQUARE 87.

There are some thousand square miles of the State of Johore in this square, which is botanically almost unknown.

Lake and Kelsall crossed a corner of it when they descended the Sungei Simpang Kanan, and similarly Ridley when he ascended it, as recorded under the heading of the last square. Burkill and Haniff collected in the end of November, 1924, a few plants in it at Ulu Benut and on the west of Sedenak.

SQUARE 97.

The surface of this square is entirely of land, and in the State of Johore. Gunong Pulai is towards the south-west and Gunong Pantl towards the east.

Burbidge and Murton climbed Gunong Pulai in August, 1877 (Burbidge, Gardens of the Sun, 1880, p. 31). In the latter part of 1892, Lake took a plant collector thither from the Botanic Gardens, Singapore. Ridley, in December, 1904, took leave and spent a week upon it. In 1922, when extensive clearings were being made for waterworks, two other collectors, Mohamed Nur and Kiah, were sent thither from the Gardens. They collected along the Sungei Pulai Dua, on Gunong Pulai Duatas, on Bukit Abu Bakar and to the summit. Best visited the summit on December 18th, 1922, and Holttum on November 16th, 1924. Sedenak railway station visited by Ridley in August, 1908, is within the square to the north of Gunong Pulai.

Burkill and Haniff collected in the end of November, 1924, on the Scudai river to the south-east of Gunong Pulai.

Vesterdal collected at Mount Austin to the north of Johore Bahru.

In 1880 Kunstler visited Gunong Pantl in June. In December, 1892, Ridley climbed it from Kota Tinggi, and again in 1910 with le Doux. Holttum in March, 1925,

climbed it also with le Doux, and Haniff in December, 1925, and Holttum in February, 1926.

Gunong Muntahak which is near was visited by Kloss.

Southwards and right upon the edge of the square is Panchur where Ridley collected in 1900.

King in 1879 with Hullett visited Jaffaria which is somewhere within the southern edge of this square; and in May, 1903, Ridley visited Castlewood, which is not far away.

The total number of species of the Thalamiflorae-Calyciflorae collected is on the map 242 and our knowledge judged by this may be twenty per cent.

SQUARE 0l.

There are about 450 square miles of the State of Johore in this square, all but botanically unknown.

It has been said that Lake and Kelsall collected on the Sedili river; but that statement is erroneous Feilding in 1892 and Down are the only persons who have collected upon it and they only a very little.

Ridley visited Johore Lama which is upon the western margin in October, 1900, from Pandim in square 9l.

SQUARE 8m.

There are only 60 square miles of the State of Johore in this square; it consists of very low-lying land. Kukob, which is the chief place in it, and the Tempayan river were visited by Ridley in April, 1908, and the Penerok river by Burkill on August 10th, 1913, and January 25th, 1914.

SQUARE 9m.

This is the square of Singapore Island; and contains with it a small part of the State of Johore wherein is the town of Johore Bahru.

The part of Johore which is in the square has been visited by Ridley at such localities as Tanjong Bunga, Tanah Runto, Tanjong Kupang and Tanjong Merawan. King, Hullett and Kunstler visited Johore Bahru.

Raffles at his taking over of Singapore collected plants, as Jack tells us in one of his letters to Wallich, being three species of Nepenthes: then Jack himself visited Singapore in June, 1819 (*vide* Journal of the Straits Branch of the Royal Asiatic Society, No. 73, p. 177). At this time Singapore Island was so completely "covered with jungle" that there was found to be clear only "a small spot on the eastern bank of the river barely large enough to pitch the tents on" which Raffles had brought with him.

Wallich in 1822 voyaged to Singapore expecting to meet his friend Jack, but Jack was dead then. Farquhar, who has been mentioned as having botanised in Malacca, was then Resident; and Wallich enjoyed his friendship as he had that of Raffles. He collected with his usual energy from August to the end of November. In the same year, but from January 20th to 25th, Finlayson had been in Singapore and collected. Wallich's specimens, Finlayson's and such as Jack had sent to Wallich, were among those distributed from London by Wallich between 1827 and 1832.

Gaudichaud was the next botanist to touch at Singapore. and that very lightly in the month of February, 1837. In 1835 and 1839 Cuming entered the port in his little exploring schooner, and collected, but chiefly living plants (*vide* Gardens Bulletin, 2, p. 441). In 1845 or 1846 Thomas Lobb likewise collected.

At this time the cultivators of gambier and pepper were completing the overrunning of the island with their temporary cultivation: the forest had suffered most extensive destruction both to get virgin soil for the pepper and fuel for the gambier boiling.

Oxley towards the end of a residence in the East of twenty-five years entered into correspondence with Kew, and sent plants: he sent plants also to Voigt in Bengal. A contemporary of his was Motley who during his residence of a year in Borneo, visited and collected a little in Singapore: this was apparently in the year 1852. Early in 1857 Sir Robert Schomburgk passing through the port collected for Kew. In 1861 Thomas Anderson doing the same collected and so also Kurz in December, 1863. In May or June, 1865, Beccari reached Singapore upon his way to Borneo and apparently he visited Singapore more than once afterwards, using these opportunities for collecting. In September, 1867, Maingay, passing through Singapore collected: and Wawra likewise passed through the port thrice, once at the end of 1872 and twice early in 1873; and also collected. In 1879, in August and September, Sir George King collected in Singapore.

In Wight's herbarium were some plants labelled "Singapore, Dawood." It is suspected that a native collector named Daud had got them at the instance of Wight's brother.

The continuous botanising of Singapore commenced in 1875 when Murton was appointed to the post of Superintendent of the Botanic Gardens. He was ambitious of producing a Flora of the island, and probably collected with diligence; but destroyed his collections when leaving Government service. In his time the neighbourhood of the Gardens seems to have been covered either with secondary

forest or with forest greatly deteriorated by the removal of timber. Cantley succeeded Murton in 1880; and set to work at the investigation of the flora: but his impaired health drove him to England in 1881, whither he took, to work at in the Royal Gardens, Kew, as many specimens as he could accumulate. Returning in 1882, he began to train a plant-collector, and tried to set in order what Murton had left; and in March of the year he was instructed to draw up recommendations for the care of the forests and forest lands of the Straits Settlements. His report on them was out in July, 1883; and it contains an interesting list of timber trees then verging on extinction in Singapore island. (Reports on the Forests of the Straits Settlements, appendix). At that date "such Crown forests as remained uncut were widely distributed in isolated patches over the island.....of various sizes from half an acre or so to twenty acres" and the Government had difficulty in selecting areas for economical conservation, so much so that not one half of these first suggested actually were included within the final selection as Reserves; and if reference be made to Ridley's Annual Report on the Botanic Garden and Forest Department for the year 1889, p. 10, it will be realised that failing to find adequate virgin forest that which was reserved contained very little good forest.

When Cantley died, Ridley in 1888 succeeded him as Director of Gardens and Forests. Unfortunately he found that much of what had been collected had perished: and this being so, the Singapore Herbarium is almost entirely of the latter's creating. Tassim Daud worked as a plant collector under him and as herbarium keeper until 1895; and Goodenough was temporarily under him in Singapore in 1895 and 1896. He frequently sent trained native plant-collectors out with exploring parties willing to look after them.

Hull-ett, who had been stationed in Singapore for a number of years, presented his herbarium to the Singapore Gardens when leaving the East in 1889.

Burkill succeeded Ridley in 1912. He was joined by Baker for a part of 1917, by Chipp in 1919 and 1920, by Holtum in 1922, and by Henderson in 1924. Working under these were the following who collected also, Ahmed bin Hassan, Kastawi bin Jalil, Mohamed Nur bin Mohamed Ghose, Ahmed bin Hadji Omar, Subramanian, Kiah bin Hadji Mohamed Salleh and others and their names will be found on plant-labels.

Visitors who have collected in Singapore since 1880 have been Scortechini who was on the island in 1886; Max Fleischer in 1898; Raciborski in 1899; Engler in 1905; Matthew in 1913.

The last named visited Johore also. In 1901 there was resident in Johore Jansen who conceived the idea of collecting sets of plants for sale; but seems not to have carried it out, though plants collected by him are conserved at Copenhagen.

In the year 1900 Ridley published a Flora of Singapore in the Journal of the Straits Branch of the Royal Asiatic Society, No. 33, p. 27. and in 1901 he published some addenda in No. 35, p. 84.

It is interesting that the lesser the land surface the further from typical high forest is the vegetation upon an islet: and this is illustrated by Holttum's account of the plants upon Pulau Jong (Singapore Naturalist, Vol. I, 5. p. 47.) Pulau Jong is a few miles removed from the south shore of Singapore island.

Very little has been added since Ridley's Flora; so little that the island itself may be held as about ninety-nine per cent. known: but within the square is a part of the State of Johore, which is scarcely known, and taking it into consideration it may be assumed that the square is about ninety-six per cent. known.

SQUARE 0m.

The land surface within this square is only about 160 square miles of the State of Johore. Opposite to it are parts of the Dutch islands of Pulau Batam and Pulau Bintang which are outside our consideration.

The square was overrun by pepper and gambier plantations in the years 1840-1850 and other planting has followed. Ipecacuanha was grown there about 1880-1890 at Pinverong: and it was probably on a visit to the plantation that Cantley got the Johore specimens which he took to Kew in 1882: they are dated February.

Feilding visited Tanjong Surat which is north-north-east of Changi in 1892. Ridley in 1890 collected over the island of Pulau Tekong.

It is chiefly from the collections of the last that we know so many of the Thalamiflorae-Calyciflorae of the square as 48. It indicates about ten per cent.

THE COLLECTING PLACES.

**This list serves as an index to the foregoing pages
and is meant to be used in the herbarium as a
means of getting, with the aid of maps, as
much information as possible out of
the localities given upon labels.**

- Alor=a ford
 Gajah—6k
 Sta—2b
 Ampang (Ipoh)—4e
 Anak Bukit—2b
 Ara Kudah—3d
 Aring—6d
 Area islands—3j
 Ayer=water or stream
 Hangat—1b
 Hitam—8h
 Kroh—6k
 Kuning (Taiping)—3e
 Kuning (N. Sembilan)—6j
 Panas (two)—6k
 Puteh—8g
 Raja forest—5h
 Assam Kumbang—3e
 Asun—2b

 Bagan Datoh—3g
 Bagan Serai—3d
 Bahau forest—6j
 Baling—3c
 Balok—8g
 Bandar Matahari—2c
 Bandar Penggaram—7l
 Bandar Telok Anson—4f
 Bangi—5j
 Batang Benar—5j
 Batang Berjuntai—4h
 Batang Padang—4f
 Bator Kelantan—6e
 Batu=rock
 Balai—6g
 Bau—5e
 Berjongkong—1b
 Bunga—1b
 Caves—5h
 Gajah—4f
 Hampar—3e
 Kurau—3e
 Pahat—7l
 Papan—5e
 Talam—5g
 Tiga—5h
 Tugoh—3e
 Bedong—3c
 Behrang forest—5g
 Bekok—8k
 Belimbing (Legoh)—5b

 Belimbing (Malacca)—6k
 Belingu—6h
 Bemban (nr. Triang)—6j
 Benchah forest—6f
 Benom mountain—6g
 Benta—5f
 Bentong—5g (5h)
 Benus valley—5h
 Benu—8l
 Beranang—5j
 Bernam river—3-5g
 Beserah—8g
 Besih Hangat—2b
 Betong—4c
 Biawak—7k
 Bidor—4f
 Bikum—4g
 Bilut reserve—5g
 Bintang—7h
 Biserat—4a
 Blanja—3f
 Blanda Mabok—3e
 Blay Manis—6f
 Bohei—8h
 "Box" hill—3e
 Briah—3d
 Bruas—3f
 Budu—6f
 Bukit = a hill or ascent
 Abu Bakar—9l
 Banang—7l
 Belata—4g
 Bertam—6k
 Besar—4d
 Besih Hangat—2b
 Birch—3e
 Bruang—6k
 Cheraka—4h
 Danan—6k
 Duri—7h
 Dusun Paya—6k
 Etam—5h
 Fraser—5g
 Galing—8g
 Goh—8g
 Gowa—4a
 Itam—5h
 Jalor—4a
 Jelatah—5e
 Jitan—8k
 Kajang—6k

Cameron's Plateau—4f
Cape Rachado—5k

Gopeng—4f

- Johore State—7-0k, 7-0l, 8-0m
 Johore Bahru—9m
 Johore Lama—0l
 Jor—4f
 Juasseh—6j
 Jugra—4j

 Kadondong—6g
 Kahang river—9k
 Kajang—5j
 Kal=Kol
 Kala Kiri—4a
 Kalambalai—8h
 Kalindi—4f
 Kampar—4f
 Kampong=village
 Bandar Bahru—3f
 Gajah—4f
 Kobang—6d
 Kota (on Plus river)—3e
 Kota (Kelantan)—6b
 Parit—6c
 Pianggu—9j
 Simpai—8k?
 Kamposa—6b
 Kamunting—3e
 Kamuning—4e
 Kanching—5h
 Kangar—2b
 Kapayang—5j
 Karak—6h
 Katapang—8h
 Katapang—7k
 Kechau river—6f
 Kedah State—2a, 1-4b, 2-4c, 3d
 Kedah Peak—2c
 Kelantan State—6b, 5-6c,
 4-6d, 4-7e
 Kelantan river—6b, 6c
 Kelumpur—6e
 Kemaman—8f
 Kendong—6j, 6k
 Kenering—4d
 Kepala Batas—2b
 Kepis forest—6j
 Kepong—5h
 Kerling—5g
 Khol—6f
 Kinta—4f
 Kertai—4d
 Keru—6k

 Klang—4h
 Klang Gates—5h
 Klang water catchment
 forest—5h

 Khan=a pit
 Intan—4c
 Trus—2c
 Kluang—8k
 Kluang Terbang—6g
 Kota=a fort, or locally a cave
 (Kota, Taiping)—3e
 Bahru (Kelantan)—6b
 Bahru (Kinta)—4f
 Bahru (Rahman)—4b
 Glanggi—6g
 Tampan—3d
 Tinggi—9l
 Tongkat—6g
 Sarong Semut—2c
 Stia—3f
 Kramat (Ridley's at Pekan)
 —8h

 Krian—2d, 2e
 Kroh—4c
 Kuala- rivermouth
 Aring—6d
 Bedong—6e
 Bera (Pahang)—7h
 Bera (Perak)—
 Brawas—8g
 Brok-Bera
 Burau—1b
 Depang—4f
 Dong—5g
 Endau—9j
 Endong—6d
 Essam—6l
 Kahang—8k
 Kangsar—3e
 Kedah—2b
 Kendrong—4d
 Kerteh—5e
 Krai—6c
 Krau—6g
 Kuah—1b
 Kubu—5g
 Kurau—2e
 Langat—4j
 Lebir—6c
 Lepar—8h
 Limau Nipis—6d

Panchur—9l
 Pandim—9l
 Pangkor—3f
 Pantai (Kelantan)—6b
 Pantai (N. Sembilan)—6j
 Parit forest—3f
 Parit Jawa—7l
 Pasir=sand, a sandy beach
 Panjang forest—5k
 Panjang Ulu—3f
 Puteh forest—5k
 Loyang—6g
 Salak—3f
 Pasoh—6h
 Patani or Pattani States—
 4-5a, 3-6b, 5c
 Patani Ketchil—7l
 Patani town—4a
 Pegang—8h
 Pekan—8h (8g)
 Pelangai—6h
 Penang—2d
 Penarak—1b
 Penerok estate—8m
 Pengkalan—a landing place
 Bahru (on Bruas river)—3f
 Kazai—8h
 Kempas—6k
 Penjom—6f
 Penyabong—9j
 Perak State—3-5c, 3-5d, 2-5e,
 3-5f, 4-5g
 Perhentian Tinggi—5j
 Perlis State—2a, 2b
 Permatang Bertam—2d
 Petasih, nr. Triang—6h
 Pianggu—9j
 Pinang Tunggul—2c
 "Pine-tree Hill"—5g
 Pinyerong—0m
 Plus river—4e
 Pondok Tanjong forest—3d
 Pontian—8l
 Port Dickson—5j
 Port Swettenham—4h, (4j)
 Prai—2d
 Pramau—8g
 Province Wellesley—2-3c, 2-3d
 Puket circle—1-2a
 Pulau—5e
 Pulau mountain—9l

Pulau—an island
 Adang—1a
 Ampak—1b
 Aor—0k
 Besar—6k
 Chengei (Chenggal)—6g
 Chupak—1b
 Datoh—6f
 Dayang—0k
 Dayang Bunting—1b
 Dodol—6k
 Hujong Duri—1a
 Jarak—2g
 Jong, Langkawi—1b
 Jong, nr. Singapore—9m
 Jellam—6h
 Ketam—8d
 Kinchi—6f
 Lallang—3f
 Lidi—1b
 Manis (upper Pahang R.)
 —6f
 Manis (lower Pahang R.)
 —8g
 Nangka—6k
 Nior Stali—1b
 Nipis—1a
 Padang—6f
 Pinang (Redang Is.)—8c
 Rawei—1a
 Rumbia—3f
 Rumput—8g
 Sakijang—9m
 Sanggul—0k
 Segai—1b
 Songsong—2c
 Tawar—6g
 Tekong—0m
 Tengah—1a
 Terutau—1a
 Tiga (Perak river)—3f
 Tijau—6f
 Tinggi—0k
 Tirie—1b
 Tiuman—0j
 Ubin—9m
 Quedah=Kedah
 Rahman State—4-5a, 4b, 4c
 Rajah Itam—3f

- Rantau—5j
 Rantau Panjang—4h, 5h
 Raub—5g
 Rawang—5h
 Rawei island—1a
 Redang islands—8c
 Reko woods—5j
 Relau Tujur—3e
 Rembau—6j
 Renchong—8h
 Renggam—8l
 Rihlau—7k
 Rim—6k
 Riverside—6c
 Rompin river—8j
 Rumbia—6k
 Rumbia island—3f
 Rungkup—3g
- Sai State—5a, 5b
 Salak—4e
 Salak (Kuala Lumpur)—5h
 Sawngkla—3a
 Scudai river—9l
 Sedenak—8l, 9l
 Sedili river—0l
 Selama—3d
 Selandar—6k
 Selangor State—3-5g, 4-5h,
 4-5g
 Selangor river—4h, 5g
 Selaru—6j
 Selinsing river—3e
 Semangkok Pass—5g
 Semantan—6h
 Sembilan islands—3f
 Senaling—6j
 Senaling Inas forest—6j
 Senawang—5j
 Sendayan—5j
 Sennyum—6g
 Sepang—5j
 Serdang—5h
 Seremban—5j
 Serendah—5h
 Serom—8k
 Serting forest—6j
 Setul (Siam)—1-2a
 Setul (N. Sembilan)—6j
 Siliau—5j
 Siminyih—5h
- Simpai—8k
 Simpam river—5g
 Simpang—a possibility,
 parting ways
 (Simpang nr. Taiping) —3e
 Ampat in Krian—3e
 Kanan river—7l
 mines—5g
 Simpiti—3f
 Singapore island—9m
 Sira Rimau—3d
 Sirusa—5j
 Sitiawan—3f
 Slim—4g
 Sungei=river
 Bagu in Tiuman—0j
 Batu Asah—
 Bau—9k
 Bera—7h
 Benchah—6f
 Bertam—4f
 Biku—8k ?
 Buloh forest—5h
 Cheka—6f
 Galas—6d
 Jelei in Pahang—5-6f
 Jelei in N. Sembilan—6j
 Jerneh—6k
 Kahang—8k
 Kaloh—5e
 Keluang—2d
 Kenering—4d
 Kertai—4d
 Kesang—7k
 Ketei—6e
 Kulim—4d
 Lebir—6d, 6e
 Lenggih—8k ?
 Lepar—7g
 Liang—5g
 Limau—3e
 Madek—9k
 Mahang—8h
 Malati—8k
 Meang—8h
 Merapoh—5e
 Menyala—5k
 Morai—0m
 Njing—4e
 Patani—2c

- Telok Pinang—4e
 Telubin river—5a
 Temengor—4d
 Temerloh—6h
 Temiang—6d
 Temiang (Nr. Seremban)—5j
 Tembeling river (lower)—6f
 Temoh—4f
 Temoyang—1b
 Tempayan—8m
 Tengarok—9k
 Tenok—
 Tepa State—3-4a, 3b
 Terutau—1a
 Tiuman—0j
 Tokong=a rock
 Sanggul—0k
 Tomo—5c
 Tras—5g
 Tremangan—5b
 Trengganu State—6-8c, 6-8d,
 7-8f
 Trengganu town—8d
 Triang forest—6j (6h)
 Trolak—4g
 Trong—4e
 Tupai—3e

 Ulu=headwaters of a stream
 Batu Pahat—8l

 Bendol—6j
 Benut—8l
 Bera (in Perak)—5g
 Bera (in Pahang)—
 Bubong—5g
 Chineras—6f
 Gombak—5h
 Kahang—9k
 Kal—Kol
 Kenering—4d
 Kerling—5g
 Kol—5g
 Langat—5h
 Madek—9k
 Pedas—6j
 Petasih—6j
 Rembau—6j
 Sapetang—3e
 Sedili—9l
 Selama—3d
 Selangor—5g
 Slim—5g (5f)
 Tekam—7g
 Utan Melintang—3g

 Waterloo estate—3e
 Weld's Hill—5h

 Yan—2c

"THE PALMS OF BRITISH INDIA AND CEYLON."

The volume published under the above title by the Oxford University Press comes from the able pen of Father E. Blatter. Having lived for many years in India he has had exceptional opportunities to study both indigenous and introduced species of the Palm family. This, coupled with a keen interest in the subject, has resulted in the production of a book, useful alike to the botanist and the layman. Much useful information is contained in the volume, well supported by numerous photographs and figures which are a very great help for identification purposes.

The introduction contains much useful information (i) in regard to the Geographic Distribution of *Palmae* generally, (ii) a short history of the exploration of the Palm flora in India together with a detailed account of its distribution and (iii) a general description of Palms couched in popular language.

The remainder of the book is devoted to (i) descriptions, (ii) considerable information concerning the economic value and uses of some species with histories and legends concerning them and (iii) photographs and figures. The descriptions generally, are very good and are set forth in scientific terms. Keys for identification purposes have been utilised in dealing with all genera and to a lesser extent, for the species. The generic keys are of necessity couched in botanical terms. Specific keys have been treated less scientifically, being in most cases based on general characteristics. Similarly, in a few instances the distinguishing features of two species have been contrasted or tabulated side by side. These, together with the many admirable photographs, should be of considerable assistance in the identification of species and will certainly be welcomed by the layman. This work might have been applied with good results to all genera in which two or more species are mentioned. The economic uses and importance of several of the better known species are dealt with in detail, especially in the cases of the Coconut, Betel Nut, and Date Palm. The histories and legends connected with these latter, are mentioned at length and give an interesting insight into the important part played by these plants in the lives of the natives, past and present. Cultivation is briefly touched upon, that dealing with tropical planting being of most value. Considerable work has been put into the compilation of lists of common and local names which should be of considerable use for determination purposes. No review would be complete without mention of the

admirable series of photographs included in the book; they should make identification a much easier matter. These are supplemented by numerous figures dealing with the morphology of flowers, etc., as aids to identification.

The author is to be congratulated on the production of a book useful alike to the botanist and the layman, a by no means easy task.

F. FLIPPANCE.

RELATIVE HUMIDITY

of the air at the Botanic Gardens, Singapore, from wet and
dry bulb hygrometer readings made daily at 9 a.m.
during the year 1926.

Date	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	90	75	71	74	80	78	71	79	89	86	83	72
2	98	69	71	70	69	93	75	77	78	83	65	76
3	98	67	76	76	81	95	68	83	71	77	74	78
4	84	73	83	78	91	93	76	72	74	67	85	77
5	84	71	75	76	79	95	79	83	77	75	83	83
6	88	70	68	72	73	85	83	91	76	95	68	79
7	82	64	72	79	76	72	90	89	85	77	69	72
8	82	67	82	71	76	90	79	75	90	67	72	74
9	76	73	75	67	72	76	79	77	73	76	74	75
10	74	71	75	72	74	72	76	78	77	79	68	71
11	68	69	74	67	68	76	76	84	75	85	76	74
12	69	69	76	69	76	76	98	87	76	95	72	91
13	71	86	77	72	73	93	83	81	88	77	77	83
14	71	83	74	76	81	74	75	83	87	72	76	95
15	81	79	74	79	80	83	74	81	77	70	95	72
16	82	77	73	76	71	72	82	75	72	88	77	93
17	82	79	91	69	76	93	85	72	85	84	78	72
18	73	71	74	95	95	70	91	90	95	98	95	73
19	74	77	72	73	85	83	79	85	84	79	83	80
20	95	81	79	91	93	76	98	79	91	72	95	79
21	75	77	79	83	79	76	95	77	79	83	76	91
22	93	87	64	73	76	81	74	79	75	83	89	78
23	77	74	74	67	91	76	75	76	95	81	87	98
24	75	79	77	67	95	93	91	72	79	83	68	87
25	93	77	74	69	72	76	87	98	79	79	69	88
26	93	73	77	67	71	77	77	85	76	95	67	90
27	79	75	79	72	70	77	77	75	83	76	78	78
28	83	70	72	73	72	85	75	77	72	70	72	89
29	75	..	70	74	76	76	79	75	79	78	77	98
30	74	..	70	91	75	87	95	74	98	82	81	81
31	74	..	72	..	72	..	98	85	..	84	..	88

Mean for the year 79.

RAINFALL

at the Botanic Gardens, Singapore, during the first half
of the year 1926.

Readings taken at 9 a.m., and expressed in inches.

Date	January	February	March	April	May	June
1	1.00	..	.01	.01	.68	.01
2	.73	...	...	...	...	.67
3	1.36	...	...	.01	.45	.28
4	.02	...	.30	...	...	.28
5	.24	...	.03	.86	1.26	.27
6	...	...	.01	.25	.01	1.11
7	...	...	...	.01	trace	...
8	...	...	.05	...	...	.25
9	...	...	.65	trace	...	.01
10	...	...	...	...	.28	...
11	...	...	...	...	...	...
12	...	...	...	...	trace	...
13	...	.02	.09	...	.42	.14
14	...	.56	.05	...	.07	.30
15	.02	.99	.15	...	.26	...
16	...	...	...	.20	...	...
17	.24	...	.03	...	.02	1.30
18	.01	...	.02	.61	.05	1.17
19	...	...	.01	.01	.55	trace
20	.93	...	1.39	.17	.36	.14
21	.08	...	...	.14	...	...
22	.36	2.71	.01	.66	.44	...
23	trace	...	...	...	.05	...
24	.10	1.07	...	...	.30	.27
25	.02	.32	...	...	trace	trace
26	1.36	...	.06	2.02	...	...
27	.02	.03	.16	...	...	trace
28	...	...	.01	...	.09	.06
29	trace	...	...	.06	.02	1.01
30	...	...	.04	.10	...	.01
31	...	...	...	...	...	...
Total ...	6.49	5.70	3.07	5.11	5.31	8.39

RAINFALL

at the Botanic Gardens, Singapore, during the second half
of the year 1926.

Readings taken at 9 a.m., and expressed in inches.

Date	July	August	September	October	November	December
1	.03	.03	2.79	.03	..	.03
2	.	..	trace	.01	..	.01
3	..	.85	.22	..	..	.03
4	trace	..	trace	.15	.03	.47
5	.21	.65	.01	..	..	.01
6	2 15	1.28	..	.83	..	.42
7	60	.04	.23	.04	.17	.11
8	.07	trace	1.57	..	.19	.05
9	..	..	.78	..	.02	.15
10	.21	..	..	..	..	.01
11	..	.26	..	trace	..	.29
12	3 11	trace	..	.50	.05	..
13	.05	..	.39	.62	.17	.02
14	..	..	.17	..	..	1.65
15	..	.01	.88	..	.28	..
16	..	..	..	1.16	.02	.05
17	..	..	.31	.19	1.35	..
18	..	.30	1.05	.78	3.19	1.33
19	.01	.01	.01	.92	.04	trace
20	1.82	.21	.07	trace	.49	..
21	.44	.01	1.65	..	trace	.07
22	01	..	..	.04	1.51	1.05
23	..	trace	1.54	..	trace	1 61
24	63	..	.05	1.80	.06	.01
25	.14	.77	..	trace	..	.15
26	..	.02	.06	.42	.01	.50
27	.24	trace	.14	.01	.47	trace
28	.39	..	..	..	..	.66
29	..	..	.04	trace	1.02	1.17
30	.86	.15	1.30	.20	.01	.09
31	.39	.17	..	..	..	.08
Total ..	11.36	4.76	13.26	7.70	9.08	10.02

RAINFALL

at the head of the Waterfall Gardens, Penang during the first half of the year 1926, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners, George Town, Penang.

Date	January	February	March	April	May	June
1	..	..	..	.06	..	..
2	..	..	..	..	.17	.05
3	..	..	..	..	.05	.09
4	..	..	.55	1.02	..	..
5	..	..	..	.65	..	..
6	..	..	..	.03	..	4.86
7	..	..	..	.05	..	1.00
8	..	..	.76	1.64	..	.22
9	..	..	..	.03	.03	1.22
10	.03	..	..	.05	..	..
11	..	..	..	..	..	.06
12	..	..	..	..	1.86	..
13	..	..	2.35	..	.03	.67
14	..	..	.05	.23	.10	.03
15	..	.30	.04	.03	..	..
16	..	..	..	..	.90	.04
17	.13	..	.06	.65	.11	.17
18	..	..	..	..	.12	..
19	..	.12	.97	1.78	..	.03
20	.07	..	.17	.23	..	1.50
21	..	.03	.03	..	..	..
22	.05	..	..	1.99	.18	..
23	.92	.07	..	.06	..	.15
24	..	.70	..	.04	.06	..
25	..	..	..	.03	.93	.08
26	.05	..	..	.73	..	.03
27	..	.22	..	.20	.22	.87
28	..	.07	.79	..	..	.05
29	..	..	..	.20	..	1.90
30	..	..	..	.82	.11	.06
31	..	..	..	..	.73	..
Total ..	1.25	1.24	5.77	10.52	5.60	12.58

RAINFALL

at the head of the Waterfall Gardens, Penang, during the second half of the year 1926, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners, George Town, Penang.

Date	July	August	September	October	November	December
1	.10	1.32	1.68	.37	.03	..
2	2.09	1.97	.12	.03	.56	.05
3	..	1.53	.08	.03	.98	.14
4	..	..	2.87	2.67	..	.04
5	..	2.95	.07	2.26	..	..
6	.16	.03	.03	.85	.03	..
7	..	..	.34	1.22	.19	..
8	..	..	1.03	.24	.20	..
9	..	..	1.98	1.65	.90	..
10	..	..	.03	8.25	..	..
11	.03	..	..	.70	..	..
12	.03	1.60	.03	2.26	..	.70
13	.62	.03	.67	2.40	.35	.57
14	..	.03	.39	.04	.53	.88
15	..	.44	..	.04	.30	.19
16	.72	.46	..	..	.09	.20
17	..	..	..	..	.03	..
18	.03	..	.22	3.28	.48	1.94
19	.34	..	..	.04	.42	.20
20	1.33	.04	..	.04	.28	.03
21	.99	..	.55	.05	.09	1.59
22	..	..	.03	..	..	.56
23	.05	.24	.44	.45	..	6.20
24	.10	.67	.99	.34	.04	1.90
25	..	1.67	.05	.19	..	.04
26	..	..	.12	1.49	..	.03
27	..	.05	.35	.09	.88	1.90
28	.10	.36	1.03	.05	1.05	2.16
29	1.05	.53	.04	.03	.58	2.19
30	..	.62	.04	.62	.86	.14
31	.53	2.00	..	.60	..	1.99
<hr/>						
Total ..	8.27	16.54	13.18	30.28	8.87	23.73

SUMMARY OF RAINFALL, 1926.

	SINGAPORE				PENANG			
	No of rainy days	Amount of rain		Longest spell without rain	No of rainy days	Amount of rain		Longest spell without rain
		inches	mm			inches	mm.	
January	17	6 49	165	9 days	6	1 25	32	8 days
February	7	5 70	145	12 ..	7	1 24	31	13 ..
March	18	3 07	78	3 ..	10	5 77	147	6 ..
April	15	5 11	130	6 ..	21	10 52	267	3 ..
May	20	5 31	135	2 ..	15	5 60	142	5 ..
June	20	8 39	213	3 ..	20	12 58	320	2 ..
July	19	11 36	289	5 ..	16	8 27	210	4 ..
August	19	4 76	121	2 ..	19	16 54	420	5 ..
September	22	13 26	337	3 ..	21	13 18	335	3 ..
October	20	7 70	196	3 ..	28	30 28	769	2 ..
November	20	9 08	231	3 ..	21	8 87	225	3 ..
December	27	10 02	255	1 ..	22	23 73	603	7 ..
Total	224	90 25	2295		209	137 83	3501	
Greatest amount in 24 hrs 3 19 ins or 81 mm					8 25 ins or 210 mm			
" 48 hrs 4 54 ins or 115 mm					9 90 ins or 251 mm			
" 72 hrs 4 58 ins or 116 mm					11 21 ins or 285 mm			

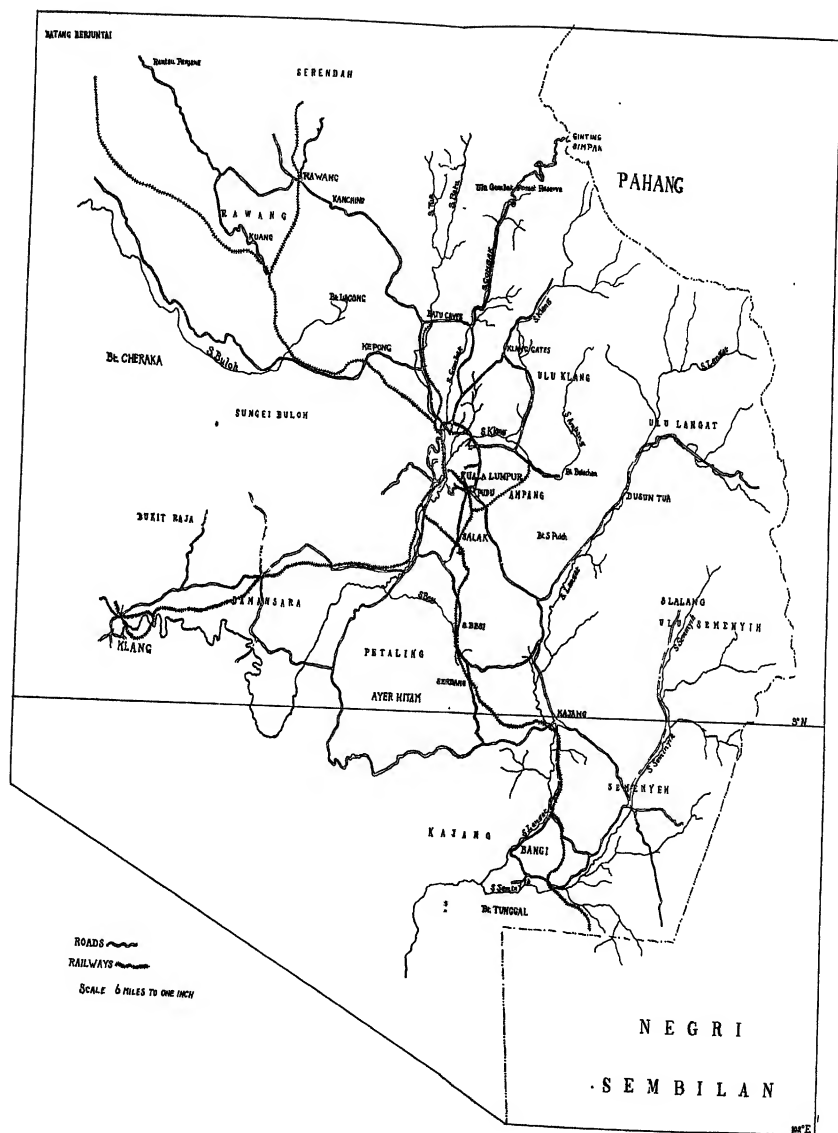
Excessively rainy periods, more than 5 ins. having fallen in 72 hours —

5 (June Oct (2) Dec (2))

Periods of comparative drought less than 02 ins having fallen in 120 hours 10

9 Jan (3) Feb (2) March
May Aug Dec 1.

(Jan (2), Feb (3), March
Apr (2), July, Aug)



THE GARDENS' BULLETIN STRAITS SETTLEMENTS

Vol. IV.

JANUARY 1928.

Nos. 6—10

THE FLOWERING PLANTS OF KUALA LUMPUR, IN THE MALAY PENINSULA.

By M. R. Henderson, F.L.S.

The following pages contain a list of the Higher Plants known from Kuala Lumpur and its vicinity.

The area which the list covers is roughly that included in a circle of which the centre is Kuala Lumpur and the radius is fifteen miles. The circle has been stretched to include nearby places from which important collections have come, but collections have not been made from every place within it.

The montane flora of the Main Range has been excluded in an endeavour to make the list contain only lowland species, but it has not been possible to do this accurately, as very few specimens were found to bear any indication of the altitude at which they were collected.

The following are the localities from which have come the collections utilised in the compilation of the list:—

Ampang Forest Reserve
Ayer Hitam Forest Reserve
Batang Berjuntai Forest Reserve
Batu Tiga
Batu Caves
Bukit Belachan Forest Reserve
Bukit Cheraka Forest Reserve
Bukit Lagong Forest Reserve
Bukit Raja Forest Reserve
Bukit Tarek Forest Reserve
Bukit Tunggal Forest Reserve
Damansara
Dusun Tua

Kajang
 Kanching
 Kepong
 Klang Gates
 Kuala Lumpur
 Kuang
 Petaling
 Public Gardens, Kuala Lumpur
 Pudu
 Rantau Panjang Forest Reserve
 Seminyih
 Sungai Buloh Forest Reserve
 Ulu Gombak
 Ulu Langat
 Weld's Hill Forest Reserve.

During recent years, the Forest Department has collected very largely in the vicinity of Kuala Lumpur, and full advantage has been taken of these collections in compiling the list. Towards the end of 1921 H. L. Hume made large collections for the F.M.S. Museums in the Batang Berjuntai and Rantau Panjang Forest Reserves, at Klang Gates, in the Ulu Gombak, and at various places close to Kuala Lumpur. These collections, along with the remainder of the F.M.S. Museums Herbarium, have now been loaned indefinitely to the Botanic Gardens, Singapore.

Ridley and his subordinate Goodenough collected at Kuala Lumpur while inspecting forests from 1889 onwards.

Smaller collections in this area have been made by Burkill, Kloss, Henderson, Milsum, Sands, and Mohamed Nur.

The writer is indebted to Dr. Foxworthy for much help, and for access to the herbarium of the Forest Department.

We are dealing here with an area large tracts of which have been completely denuded of their original covering of primary forest, and man's interference has resulted in the intrusion of numbers of widely distributed plants which can only obtain a hold when the forest is cleared. Hence the endemism characteristic of the Malayan forest flora is not strongly marked when the flora of the Kuala Lumpur area is considered as a whole. This is shown by a comparison with the flora of the Taiping region (Gardens' Bulletin, Vol. III, Nos. 7-12) where, in a heavily forested region, the specific endemism is 44%, whereas for the Kuala Lumpur area the figure is only 29%. Again, the figure for the local specific endemism for Taiping is 10% and for Kuala Lumpur 3%.

These local endemics, a list of which is given below, occur for the most part in forested areas, the exceptions being those which are peculiar to the limestone of the Batu Caves or Kanching or to the quartzite rocks of Klang Gates.

• *Local endemics in the Kuala Lumpur area.*

<i>Drepananthus carinatus</i> , <i>Ridl.</i>	Sungai Buloh.
<i>Polyalthia montana</i> , <i>Ridl.</i>	Ulu Langat.
<i>Hydnocarpus Humei</i> , <i>Ridl.</i>	Klang Gates.
* <i>Impatiens Ridleyi</i> , <i>Hook fil.</i>	Batu Caves.
<i>Gomphandra pubescens</i> , <i>Ridl.</i>	Weld's Hill.
<i>Napeodendron altissimum</i> , <i>Ridl.</i>	Ulu Gombak.
* <i>Carallia euryoides</i> , <i>Ridl.</i>	Klang Gates.
<i>Eugenia Klossii</i> , <i>Ridl.</i>	Rantau Panjang.
<i>Blastus pulverulentus</i> , <i>Ridl.</i>	Ulu Langat.
<i>Sonerila prostrata</i> , <i>Ridl.</i>	Klang Gates.
<i>Begonia rhoephila</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Brassiopsis elegans</i> , <i>Ridl.</i>	Ulu Langat.
* <i>Aleisanthia rupestris</i> , <i>Ridl.</i>	Klang Gates.
<i>Argostemma trichanthum</i> , <i>Ridl.</i>	Ulu Langat.
<i>Ophiorrhiza fruticosa</i> , <i>Ridl.</i>	Batu Caves.
<i>Urophyllum Curtisii</i> , <i>King MSS.</i>	Kuala Lumpur.
<i>Pavetta pauciflora</i> , <i>Ridl.</i>	Batu Caves.
<i>Tarenna rudis</i> , <i>Ridl.</i>	Weld's Hill.
<i>Psychotria lanceolaria</i> , <i>Ridl.</i>	Batu Caves.
* <i>Borreria pilulifera</i> , <i>Ridl.</i>	Klang Gates.
<i>Ardisia vinimea</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Linociera spicifera</i> , <i>Ridl.</i>	Rawang.
<i>Alstonia micrantha</i> , <i>Ridl.</i>	Rantau Panjang.
* <i>Hoya oclusa</i> , <i>Ridl.</i>	Batu Caves.
<i>Didissandra breviflora</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Didymocarpus primulina</i> , <i>Ridl.</i>	Klang Gates.
* <i>Boea verticillata</i> , <i>Ridl.</i>	Batu Caves.
<i>Pseuderanthemum candidum</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Pseuderanthemum sylvestre</i> , <i>Ridl.</i>	Sungai Buloh.
<i>Justicia microcarpa</i> , <i>Ridl.</i>	Batu Caves.
<i>Justicia trichodes</i> , <i>Ridl.</i>	Seminyih.
<i>Ptyssiglottis chrysea</i> , <i>Ridl.</i>	Rantau Panjang and Ulu Gombak.
<i>Cryptocarya tenuifolia</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Dehaasia elliptica</i> , <i>Ridl.</i>	Bukit Cheraka, Public Gardens and Ulu Gombak.
<i>Phyllanthus erythrocarpus</i> , <i>Ridl.</i>	Batu Caves.
<i>Sauropus elegantissimus</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Galearia lancifolia</i> , <i>Ridl.</i>	Ulu Gombak.
* <i>Trigonostemon salicifolius</i> , <i>Ridl.</i>	Kanching.
<i>Macaranga incisa</i> , <i>Gage.</i>	Kuala Lumpur.
<i>Oberonia aurantiaca</i> , <i>Ridl.</i>	Kajang.
<i>Oberonia grandis</i> , <i>Ridl.</i>	Ulu Langat.
<i>Adenoncos parviflora</i> , <i>Ridl.</i>	Batu Caves.

<i>Saccolabium macrantherum</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Thrixspermum montanum</i> , <i>Ridl.</i>	Ulu Langat.
<i>Gastrochilus longifolia</i> , <i>Ridl.</i>	Ulu Gombak.
<i>Ranalisma rostrata</i> , <i>Stapf.</i>	Batu Caves.
<i>Plectocomiopsis dubius</i> , <i>Becc.</i>	Rantau Panjang.
<i>Pandanus immersus</i> , <i>Ridl.</i>	Batu Tiga.
<i>Freycinetia acuminata</i> , <i>Ridl.</i>	Kuang and Sungai Buloh.
* <i>Raphidophora Burkilliana</i> , <i>Ridl.</i>	Batu Caves.
* <i>Pothos lorispatha</i> , <i>Ridl.</i>	Batu Caves.
* <i>Eulalia Milsumi</i> , <i>Ridl.</i>	Klang Gates.

Species marked with an asterisk are those peculiar to limestone or quartzite.

RANUNCULACEÆ.

Naravelia laurifolia, *Wall.* Ampang; Seminyih. A climber of India to the Philippines; in the Peninsula not uncommon north of Selangor, usually in secondary growth.

DILLENIACEÆ.

Delima sarmentosa, *Linn.* Batu Tiga; K. Lumpur; Petaling; Seminyih. A woody climber of Indo-Malaya and China; in the Peninsula common in open places from Langkawi to Singapore.

Tetracera sylvestris, *Ridl.* Batu Caves (Ridley). A woody climber of Borneo; in the Peninsula not very common, Penang, Perak, Negri Sembilan, Malacca, Singapore.

Acrotrema costatum, *Jack.* Seminyih (Hume). A herb of Borneo; in the Peninsula common from Langkawi to Johore, but absent from Malacca.

Wormia albiflos, *Ridl.* Weld's Hill (Forest Dept.). A large shrub, endemic and rare, hitherto known only from Johore.

Wormia oblonga, *Wall.* Batu Caves; Batu Tiga; Kuang; K. Lumpur; Seminyih. A small tree of Sumatra; in the Peninsula common in open places from Kedah to Malacca.

Wormia pulchella, *Jack.* K. Lumpur (Forest Dept.). A small tree of Sumatra and Borneo; in the Peninsula not uncommon in open places from Taiping to Singapore.

Wormia suffruticosa, *Griff.* Rawang (Goodenough). A shrub of Sumatra, Bangka and Borneo; in the Peninsula common in the south in open places.

Dillenia ? grandifolia, *Wall.* Kajang (Forest Dept.).

Dillenia meliosmaefolia, *Hook. fil.* Kajang; K. Lumpur; Ulu Gombak. A tall tree, endemic and common in forest from the Dindings to Malacca and Pahang.

Dillenia ovata, *Wall.* Weld's Hill (Forest Dept.). A small tree, endemic, not common, Penang, Perak and Pahang.

Dillenia reticulata, *King.* Public Gardens and Weld's Hill, K. Lumpur. A tree of Tongka; in the Peninsula not common, Province Wellesley and Perak.

Dillenia Scortechinii, *Ridl.* K. Lumpur; Sungai Buloh. A tall tree, endemic, not common in forest, Penang, Perak, Singapore.

Dillenia sp. Weld's Hill (Forest Dept. 5024).

MAGNOLIACEÆ.

Talauma lanigera, *Hook. fil.* Ulu Gombak (Forest Dept.). A small tree, endemic, not common, usually in montane forest, Penang, Taiping Hills, Mt. Ophir.

CULTIVATED MAGNOLIACEÆ.

Michelia Champaca, *Linn.* (Chempaka). A tree of India, cultivated throughout Indo-Malaya.

Michelia longifolia, *Bl.* (White Chempaka). A tree of Java, often cultivated in the Peninsula.

ANONACEÆ.

Cyathostemma Wrayi, *King.* Bukit Tarek Forest Reserve; Weld's Hill. A liane, endemic and rare in forest, Perak.

Uvaria excelsa, *Wall.* Petaling (Ridley). A liane of Indo-China and Borneo; in the Peninsula not very common in forest, Penang to Singapore.

Uvaria hirsuta, *Jack.* K. Lumpur (Ridley). A liane of Indo-Malaya; in the Peninsula common in forest from Penang to Singapore.

Uvaria Lobbiana, *Hook. fil. & Thoms.* Ampang; Batu Caves. A liane of Sumatra; in the Peninsula Penang, Perak, Malacca, Singapore.

Uvaria macrophylla, *Roxb.* K. Lumpur (Ridley). A liane of Ceylon, Burma and Java; in the Peninsula common from Penang to Singapore, often in open country.

Uvaria purpurea, *Bl.* K. Lumpur (fide Ridley). A liane of Indo-Malaya to the Philippines and S. China; in the Peninsula common both in open country and in forest from Perlis to Singapore.

Drepananthus carinatus, *Ridl.* Sungai Buloh (Forest Dept.). A tree, endemic and local.

Drepananthus pruniferus, *Maing.* Ulu Gombak; Weld's Hill. A tree, endemic and common in forest from Penang to Malacca.

Artabotrys gracilis, *King*. K. Lumpur (Ridley). A slender climber of Borneo; in the Peninsula not common in forest, Perak and Johore.

Artabotrys suaveolens *Bl.* Ulu Gombak (Hume). A climber of Indo-Malaya to the Philippines; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Desmos chinensis, *Lour.* Ampang; Sungai Buloh; Weld's Hill. A shrub or climber of Indo-Malaya and China; common over the whole Peninsula usually in open country.

Desmos cochinchinensis, *Lour.* Rawang (Goodenough). A slender climber of Indo-Malaya to the Philippines and China; in the Peninsula common north of Malacca in open places.

Desmos dasymaschala, *Safford.* K. Lumpur; Sungai Buloh. A shrub or small tree of Burma, Siam, Sumatra and Java; in the Peninsula common from Perlis to Singapore.

Polyalthia bullata, *Hook. fil. & Thoms.* Dusun Tua; Seminyih. A shrub, endemic, not common, Perak, Pahang, Negri Sembilan, and doubtfully from Malacca and Singapore.

Polyalthia cinnamomea, *Hook. fil. & Thoms.* Weld's Hill (Forest Dept.). A tree, endemic, not very common in forest, Langkawi to Malacca.

Polyalthia congregata, *King.* Batu Caves; Ulu Gombak. A tree of ? Sumatra; in the Peninsula rare in forest, Larut and Gopeng, Perak.

Polyalthia Hookeriana, *King.* Weld's Hill (Forest Dept.). A tree, endemic, in forest, Perak (common), Pahang, Malacca.

Polyalthia hypogaea, *King.* Kanching; Seminyih. A small tree, endemic, not common in forest, Perak, and doubtfully from Pahang and Johore.

Polyalthia Kunstleri, *King.* Sungai Buloh (Forest Dept.). A shrub or tree, endemic, not very common in forest from Penang to Malacca.

Polyalthia macrantha, *King.* Ulu Gombak (Hume 9289). A tall tree, endemic and rare in forest, hitherto known only from the base of the Taiping Hills.

Polyalthia macropoda, *King.* Bukit Cheraka; Kajang; Seminyih; Ulu Gombak; Weld's Hill. A tree, endemic, not uncommon in forest from Penang to Singapore.

Polyalthia montana, *Ridl.* Ulu Langat (Kloss, fide Ridley). A tree, endemic and local.

Polyalthia oblonga, *King.* Ulu Gombak, common (Hume). A small tree of Borneo; in the Peninsula not very common in forest, Penang, Perak and Johore.

Polyalthia Scortechinii, *King*. Public Gardens, Kuala Lumpur; Sungai Buloh. A small tree, endemic and not uncommon in forest from Langkawi to Singapore.

Polyalthia stenopetala, *Ridl*. Dusun Tua; Kanching; K. Lumpur; Petaling; Ulu Gombak. A small tree, endemic, Upper Perak and Kelantan to Malacca, in forest.

Polyalthia sumatrana, *King*. Kanching; Sungai Buloh; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula Taiping to Singapore, in forest.

Polyalthia ? *Wrayi*, *Ridl*. Dusun Tua (Ridley 7281).

Anaxagorea Scortechinii, *King*. Dusun Tua; Klang Gates; Rawang; Seminyih. A bush or small tree of Lower Siam; in the Peninsula common in forest from Langkawi to Singapore.

Goniiothalamus Curtisii, *King*. Batu Caves; K. Lumpur; Ulu Gombak. A shrub or small tree, endemic, not common in forest, Perak and Selangor.

Goniiothalamus malayanus, *Hook. fil. & Thoms*. K. Lumpur; Kuang; Rantau Panjang (Kloss, fide Ridley). A small tree of Bangka and Borneo; in the Peninsula common in forest from Kelantan and Perak to Singapore.

Goniiothalamus pendulifolius, *Ridl*. Kanching (Forest Dept. 11204). A shrub, endemic and rare, hitherto known only from near Bentong, Pahang.

Goniiothalamus Ridleyi, *King*. K. Lumpur (Forest Dept.). A small tree of Borneo; in the Peninsula not uncommon in forest.

Goniiothalamus Scortechinii, *King*. Ulu Gombak (Ridley). A shrub or small tree, endemic, not common, Penang, Perak, Pahang.

Goniiothalamus tenuifolius, *King*. Sungai Buloh; Ulu Gombak. A shrub or small tree, endemic, not very common in forest from Kedah to Pahang and Selangor.

Goniiothalamus Wrayi, *King*. Seminyih; Ulu Gombak. A shrub or small tree, endemic, not uncommon in Perak.

Orophea dodecandra, *Miq*. Petaling; Seminyih. A tree of Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Orophea enterocarpa, *Maing*. Ulu Gombak (Hume 8475, 8844). A small tree, endemic not common in forest, Perak, Pahang and Malacca.

Orophea setosa, *Oliv*. Seminyih; Ulu Gombak. A shrub, endemic, not common in forest, Perak and Negri Sembilan.

Mitrephora macrophylla, *Oliv.* Dusun Tua; Seminyih; Ulu Gombak; Weld's Hill. A small tree, endemic and common in forest from Penang and Upper Perak to Johore.

Mitrephora reticulata, *Hook. fil.* Batu Caves; Ulu Gombak. A tree of Burma, Lower Siam, Java and Borneo; in the Peninsula common as far south as Selangor and Pulau Tioman.

Popowia fusca, *King.* Ulu Gombak (Hume). A tree, endemic, not common in forest, Perak and Singapore.

Popowia nervifolia, *Maing.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur; Rawang. A small tree of Lower Siam; in the Peninsula not uncommon in forest from Penang and Upper Perak to Johore.

Popowia nervosa, *Ridl.* Batu Caves; Weld's Hill. A small tree of Lower Siam; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Popowia pumila, *Ridl.* Batu Caves; near Klang Gates (fide Ridley). A shrub, endemic, not common in forest, Perak and Negri Sembilan.

Popowia ramossissima, *Hook. fil. & Thoms.* Batu Caves; Dusun Tua; Ulu Gombak; Weld's Hill. A small tree of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

Popowia tomentosa, *Maing.* Batu Caves (Ridley). A shrub, endemic and not uncommon in forest from Penang to Singapore.

Oxymitra biglandulosa, *Scheff.* K. Lumpur (Curtis). A woody climber of W. Malaysia; in the Peninsula not common in forest, Perak, Pahang, Malacca, Singapore.

Oxymitra latifolia, *Hook. fil. & Thoms.* Selangor, without definite locality (Ridl., August 1904). A climbing shrub, endemic, common from Langkawi to Singapore on the West.

Melodorum cylindricum, *Maing.* Ulu Gombak (Forest Dept.). A climbing shrub of Borneo, Billiton and Bangka; in the Peninsula common in the south on forest edges.

Melodorum elegans, *Hook. fil. & Thoms.* Sungai Buloh (Forest Dept.). A tall slender climber, endemic in forest, Penang, Perak, Malacca, Johore, Singapore.

Melodorum fulgens, *Hook. fil.* K. Lumpur; Ulu Gombak. A climbing shrub of Borneo; in the Peninsula not uncommon in open places from Taiping to Singapore.

Melodorum ? lanuginosum, *Hook. fil. & Thoms.* Ulu Gombak (Hume 9023, a galled specimen only).

Melodorum latifolium, *Hook. fil. & Thoms.* Ulu Gombak (Forest Dept.). A liane of W. Malaysia; in the Peninsula not common in forest.

Melodorum pisocarpum, *Hook. fil. & Thoms.* Bukit Lagong; Klang Gates; Seminyih; Ulu Gombak. A climbing shrub of Sumatra; in the Peninsula common from Penang to Singapore in forest.

Xylopia ferruginea, *Hook. fil.* K. Lumpur; Rawang. A tree of Borneo; in the Peninsula common in forest from Perak to Singapore.

Xylopia malayana, *Hook. fil. & Thoms.* Weld's Hill (Forest Dept.). A tall tree of Sumatra and Borneo; in the Peninsula common in the south, doubtfully from Penang.

Phaeanthus lucidus, *Oliv.* Batu Caves; K. Lumpur. A bush or small tree, endemic and common in forest from Penang to Singapore.

Phaeanthus nutans, *Hook. fil. & Thoms.* Batu Caves; Ulu Gombak; Weld's Hill. A bush or small tree of Sumatra; in the Peninsula common from Penang and Upper Perak to Singapore in forest.

Alphonsea Maingayi, *Hook. fil.* Ulu Gombak; Weld's Hill. A small tree, endemic and not uncommon in the south and in Pahang in forest.

Alphonsea subdehiscens, *King.* Weld's Hill (Forest Dept. 10464). A small tree, endemic and rare in forest, Perak and the Dindings.

Mezzettia Curtisii, *King.* Ulu Gombak (Hume 9689). A small tree, endemic and rare, hitherto known only from Penang.

CULTIVATED ANONACEÆ.

Anona muricata, *Linn.* (The Soursop).

Anona reticulata, *Linn.* (The Bullock's Heart).

Anona squamosa, *Linn.* (The Custard Apple). This, like the two preceding species, is a native of Trop. America, and often cultivated in the Peninsula.

Artabotrys odoratissimus, *R. Br.* K. Lumpur (Forest Dept.). Often cultivated in the Peninsula.

Canarium odoratum, *Baill.* A tree, doubtfully of Philippine origin, cultivated throughout Indo-Malaya.

Polyalthia longifolia, *Benth. & Hook. fil.* Near the Selangor Club, K. Lumpur (Forest Dept.). A tall tree of Ceylon, cultivated in India and occasionally in this country.

MENISPERMACEÆ.

Tinomiscium petiolare, *Miers.* K. Lumpur (Ridley). A liane of Indo-Malaya; in the Peninsula common from Perlis to Singapore, usually in secondary growth and open places.

Limacia oblonga, *Miers*. K. Lumpur (Ridl. 3970). A woody climber, endemic and common in secondary growth north of Malacca.

Limacia velutina, *Miers*. K. Lumpur (Ridl. 3968). A woody climber of Indo-China and W. Malaysia; in the Peninsula common from Penang to Singapore in secondary growth and open places.

Pericampylus incanus, *Miers*. Batu Tiga; Klang Gates; K. Lumpur; Seminyih. A slender climber of Indo-Malaya and China; in the Peninsula common in secondary growth, in hedges, and scrambling on bushes in open places.

Stephania capitata, *Spreng*. Rawang; Seminyih. A climber of W. Malaysia; in the Peninsula common from Penang to Singapore in forest.

Stephania hernandifolia, *Walp*. Seminyih (Hume 8015). A climber of Africa and Indo-Australia; in the Peninsula rare, Taiping, and doubtfully from Penang.

Cissampelos Pareira, *Linn*. K. Lumpur (Ridl. 3969). A slender climber, cosmopolitan; in the Peninsula not uncommon in hedges from Penang to Malacca.

CULTIVATED MENISPERMACEÆ.

Tinospora crispa, *Miers*. K. Lumpur, fide Foxworthy. A climber of Indo-Malaya; in the Peninsula introduced, cultivated and running wild in a few localities.

NYMPHAEACEÆ.

Barclaya Motleyi, *Hook. fil.* Batang Berjuntai (Ridl. 7348). An aquatic herb of Sumatra, Borneo and New Guinea; in the Peninsula Penang to Singapore, not uncommon.

CAPPARIDACEÆ.

Gynandropsis pentaphylla, *DC.* Petaling (Ridl.). A pantropic herb, common in the Peninsula in waste ground.

Capparis larutensis, *King*. Klang Gates (Ridl.). A thorny climber, endemic and rare, Larut and Kampar, Perak.

Capparis Scortechinii, *King*. Bukit Puteh Forest Reserve (Forest Dept. 10837). A climbing shrub, endemic, not common in forest, Penang, Perak.

Capparis sp. Batu Caves (Burkill 6369, fr. September).

Crataeva macrocarpa, *Kurz*. Batang Berjuntai; K. Lumpur. A tree of Indo-China; in the Peninsula common from Penang and Kelantan to Singapore, usually on river-banks.

Crataeva religiosa, *Forst.* Pudu (Goodenough 10477). A shrub or small tree of South India; in the Peninsula possibly not native, but established at Pekan (Pahang) and Tanjong Kling (Malacca), and occasionally cultivated.

VIOLACEÆ.

Alsodeia capillata, *King*. Klang Gates; Ulu Gombak (fide Ridley). A shrub, endemic, not common, Perak and the Dindings.

Alsodeia comosa, *King*. Dusun Tua; Kuang; Rawang; Seminyih. A shrub or small tree of Indo-China and Borneo; in the Peninsula not common in forest, Perak and Kuantan.

Alsodeia echinocarpa, *Korth*. K. Lumpur; Sungai Buloh; Ulu Gombak. A bush or small tree of Siam, Sumatra, Borneo, Indo-China and the Philippines; in the Peninsula common from Penang and Trengganu to Singapore.

Alsodeia Kunstleriana, *King*. Batu Caves; Klang Gates. A shrub or small tree, endemic, not uncommon in forest from Upper Perak to Johore.

Alsodeia Scortechinii, *King*. Ayer Hitam; Batu Caves; Dusun Tua; K. Lumpur. A shrub or small tree of Lower Siam; in the Peninsula not very common in forest, Langkawi, Taiping and Singapore.

Alsodeia Wallichiana, *Hook. fil.* Batu Caves (Ridl. 8252, 8624). A shrub, endemic in forest from Penang and Upper Perak to Malacca and Johore.

PITTOSPOREACEÆ.

Pittosporum ferrugineum, *Ait.* K. Lumpur (Forest Dept.). A small tree of Indo-Australia; in the Peninsula common, usually near the sea.

POLYGALACEÆ.

Polygala cardiocarpa, *Kurz*. Batu Caves, on the limestone rocks (Ridl. 8243). A small herb of Tenasserim and Lower Siam; in the Peninsula on limestone at Langkawi and Goping (Perak).

Polygala pulchra, *Hassk.* Ulu Langat (Kloss, fide Ridley). A small shrub of Java and Sumatra; in the Peninsula usually in hill forest, Perak, Selangor and Negri Sembilan.

Polygala venenosa, *Juss.* Ulu Gombak (Burkill 9967). A small shrub of W. Malaysia to the Philippines; in the Peninsula common from Penang and Kelantan to Johore, commonest in hill forest.

Salomonina cantoniensis, *Lour.* Batang Berjuntai; K. Lumpur; Ulu Gombak; and doubtless in other localities. A small herb of S. E. Asia; in the Peninsula common in grass and sandy places.

Epirhizanthus elongata, *Bl.* Seminyih (Hume 7981). A small parasitic herb of Tenasserim to Borneo and China; in the Peninsula common in forest.

Trigoniasstrum hypoleucum, *Miq.* K. Lumpur (Forest Dept.). A tree of Sumatra; in the Peninsula not uncommon from Penang to Singapore in forest.

Xanthophyllum affine, *Korth.* Batu Caves; K. Lumpur; Rawang; Sungai Buloh; Ulu Gombak. A large bush or small tree of Tenasserim to the Philippines; in the Peninsula common from Kedah to Singapore, usually in open spots.

Xanthophyllum bullatum, *King.* Dusun Tua (Ridley). A shrub or small tree, endemic and rare, known only from this locality and Taiping.

Xanthophyllum Griffithii, *Benn.* Klang Gates; K. Lumpur; Sungai Buloh. A tree of Tenasserim; in the Peninsula Penang to Malacca in forest.

Xanthophyllum obscurum, *Benn.* Public Gardens, K. Lumpur; Ulu Gombak. A tall tree, endemic, not common, Malacca and Singapore.

Xanthophyllum Palembangicum, *Miq.* Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra; in the Peninsula common from Penang to Singapore in forest.

Xanthophyllum puberulum, *Ridl.* Klang Gates (Ridl. 13390). A shrub, endemic and rare, Dindings.

Xanthophyllum Scortechinii, *King.* Weld's Hill (Forest Dept. 606, ? tree 58). A small tree, endemic and rare in forest, Penang and Perak.

Xanthophyllum stipitatum, *Benn.* Ampang (Forest Dept.). A tree, endemic, not common, Perak and Malacca.

Xanthophyllum venosum, *King.* Dusun Tua; Rawang (Kloss, fide Ridley). A small tree, endemic and rare in forest, Perak.

Xanthophyllum verrucosum, *Chodat.* Weld's Hill (Forest Dept.). A tree of Sumatra; in the Peninsula not common, Penang to Selangor.

Xanthophyllum Wrayi, *King.* Klang Gates; K. Lumpur; Sungai Buloh. A shrub, endemic and common in forest from Penang and Upper Perak to Johore.

PORTULACACEÆ.

Portulaca oleracea, *Linn.* Ampang; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A fleshy herb, pantropic; in the Peninsula a common weed in waste and cultivated ground.

HYPERICACEÆ.

Hypericum japonicum, *Thunb.* Ulu Gombak (Hume 9406, 9340). A small creeping herb of India to New Zealand; in the Peninsula not common in ricefields and open places, Kelantan, Penang and Singapore.

Cratoxylon arborescens, *Bl.* K. Lumpur; Sungai Buloh. A lofty tree of Burma, Sumatra and Borneo; in the Peninsula common from Penang to Singapore in forest.

Cratoxylon formosum, *Benth. & Hook. fil.* K. Lumpur; Seminyih. A tree of Siam and W. Malaysia to the Philippines; in the Peninsula common from Perlis to Singapore in open country.

Cratoxylon polyanthum, *Korth.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines and China; in the Peninsula Penang to Malacca in thin forest.

FLACOURTIACEÆ.

Flacourtia Cataphracta, *Roxb.* K. Lumpur (Forest Dept.). A small spiny tree of Indo-Malaya; in the Peninsula common in villages.

Flacourtia Rukam, *Zoll. & Mor.* K. Lumpur (Forest Dept.). A small thorny tree of Indo-Malaysia; in the Peninsula common from Penang and Upper Perak to Singapore, a variety cultivated.

Hydnocarpus castanea, *Hook. fil.* Batu Caves; Weld's Hill. A tree of Burma and Tenasserim; in the Peninsula common in forest north of Malacca.

Hydnocarpus Humei, *Ridl., Kew Bull., 10, 1926, p. 470.* Klang Gates (Hume 7256). A small tree, endemic and local.

Hydnocarpus nana, *King.* Sungai Buloh (Nur 11884). A small tree, endemic and not rare in forest in Penang, Province Wellesley and Perak.

Taraktogenos Kunstleri, *King, var. tomentosa, Ridl.* K. Lumpur and Ulu Gombak (Forest Dept.). A tree of Sumatra (the species); in the Peninsula rare, both the species and var. in Perak.

Taraktogenos ? Scortechinii, *King.* Ulu Gombak (Forest Dept.).

Taraktogenos sp. Weld's Hill (Forest Dept. 828).

Pangium edule, *Reinw.* Batu Caves; Sungai Buloh. A tree of W. Malaysia; in the Peninsula Upper Perak and Kelantan to Pulau Tioman.

Scaphocalyx spathacea, *Ridl.* Ulu Gombak; Weld's Hill. A small tree, endemic and not common in forest, Negri Sembilan and Malacca.

Ryparosa fasciculata, *King.* Bangi; Klang Gates; Sungai Buloh. A tree, endemic, apparently not common in forest, Perak and the Dindings to Malacca.

Ryparosa Kunstleri, *King.* Kajang; K. Lumpur. A tall tree of Sumatra; in the Peninsula not common, Perak and the Dindings.

Ryparosa Scortechinii, *King*. Bangi; Sungai Buloh; Weld's Hill. A small tree, endemic in forest from Penang and Kelantan to Selangor and Pahang.

CULTIVATED FLACOURTIACEÆ.

Hydnocarpus anthelminticus, *Pierre*. (Chaulmoogra). Serdang Experimental Plantation. A tree of Cochin-China.

Taraktogenos Kurzii, *King*. (Burmese Chaulmoogra). Serdang Experimental Plantation. A tree of Burma.

GUTTIFERÆ.

Garcinia eugeniaefolia, *Wall*. Weld's Hill (Forest Dept.). A tree of Tenasserim; in the Peninsula common in forest from Kedah to Singapore.

Garcinia Forbesii, *King*. Sungai Buloh (Forest Dept.). A small tree of Sumatra; in the Peninsula not common, Perak, Pahang and Singapore.

Garcinia globulosa, *Ridl*. Weld's Hill (Forest Dept.). A tree, endemic, and common in forest from Perak to Singapore.

Garcinia nigrolineata, *Planch*. K. Lumpur; Rawang; Sungai Buloh. A tree of Burma, Siam and the Carimons; in the Peninsula common in forest from Langkawi to Singapore.

Calophyllum ferrugineum, *Ridl*. Sungai Buloh (Forest Dept. 2264). A tall tree, endemic and rare, known only from this locality and from Singapore.

Calophyllum floribundum, *Hook. fil*. Sungai Buloh (Forest Dept.). A tree, endemic, not very common, Perak, Pahang, Malacca and Singapore.

Calophyllum Griffithii, *T. Anders*. Sungai Buloh (Forest Dept.). A tall tree of Sumatra; in the Peninsula not common, usually on riverbanks, Penang, Malacca, Johore and Singapore.

Calophyllum inophyllum, *Linn*. K. Lumpur (Forest Dept.). A tree of Africa and Indo-Australia; in the Peninsula common, usually on sandy seashores.

Calophyllum Kunstleri, *King*. Weld's Hill (Forest Dept. 1831, tree 303). A tree of Borneo and the Philippines; in the Peninsula Langkawi to Negri Sembilan and Pahang.

Calophyllum macrocarpum, *Hook. fil*. Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Borneo; in the Peninsula not common on riverbanks and near the sea, Perak, Malacca, Johore and Singapore.

Calophyllum Wallichianum, *Planch. & Triana*. Bangi; K. Lumpur; Sungai Buloh. A tall tree, endemic, common in forest from Penang to Singapore.

Kayea caudata, *King*. Klang Gates; ? Sungai Buloh. A small tree, endemic, not common in forest, Perak to Negri Sembilan.

Kayea elegans, *King*. Klang Gates (Ridley 13527). A tree, endemic and rare, Gunong Bubu (Perak).

Kayea grandis, *King*. Public Gardens, K. Lumpur; Ulu Gombak. A tree, endemic and common in forest from Penang to Malacca.

Kayea Kunstleri, *King*. K. Lumpur; Sungai Buloh; Ulu Gombak. A shrub or small tree, endemic in forest, Kedah, Penang, Perak, Dindings.

Kayea nervosa, *T. Anders*. Sungai Buloh; Weld's Hill. A tree of Burma; in the Peninsula rare in forest, Taiping.

Kayea rivulorum, *Ridl.* Kanching, fide Ridley. A small tree, endemic and rare, Malacca.

Mesua ferrea, *Linn.* Kajang; Sungai Buloh. A tall tree of India, Indo-China, Siam and Java; in the Peninsula common from Penang to Singapore.

CULTIVATED GUTTIFERÆ.

Clusia odorata, *Seem.* K. Lumpur (Forest Dept.). A bushy tree of Central America; in the Peninsula occasionally cultivated.

Garcinia atroviridis, *Griff.* K. Lumpur (Forest Dept.). A tree, endemic, Penang to Singapore, wild and cultivated.

Garcinia dulcis, *Kurz.* K. Lumpur (Agri. Dept.). A tree of W. Malaysia, common in cultivation in the Peninsula.

Garcinia Mangostana, *Linn.* (The Mangosteen). Cultivated everywhere in the Peninsula, but not known in a wild state.

Garcinia Prainiana, *King*. K. Lumpur (Agri. Dept.). A tall tree, endemic and not uncommon in orchards in Perak and Pahang.

Garcinia xanthochymus, *Hook. fil.* K. Lumpur (Agri. Dept.). A tree of India, Burma and Tenasserim; in the Peninsula occasionally cultivated.

TERNSTROEMIACEÆ.

Adinandra macrantha, *Teys. & Binn.* Weld's Hill (Forest Dept. 970). A tree of Sumatra and Java; in the Peninsula apparently not common, Perak, Pahang and Johore.

Eurya acuminata, *DC.* Klang Gates; K. Lumpur; Petaling; Seminyih; Ulu Gombak. A shrub or small tree of Indo-Malaysia and China; common over the whole Peninsula in open country and occasionally in forest.

Pyrenaria acuminata, *Planch.* K. Lumpur (Curtis, Forest Dept.). A small tree, endemic, common in forest from Penang and Kelantan to Singapore.

Gordonia concentricatrix, *Burkill.* Rantau Panjang (Forest Dept. 878). A tall tree, endemic, not common in forest, Dindings, Pahang, Malacca.

Saurauia cauliflora, *Bl.* Batu Caves (Burkill 6257, Ridley 8269). A tree of Java; in the Peninsula rare near limestone, Batu Kurau (Perak).

Saurauia nudiflora, *DC.* Ulu Gombak (Forest Dept. 10452). A small tree of Java; in the Peninsula in forest from Upper Perak to Negri Sembilan.

Saurauia tristyla, *DC.* Batu Caves; Klang Gates; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A small tree of Siam and Indo-China; in the Peninsula common usually in forest.

Archytea VahlII, *Choisy.* K. Lumpur (Forest Dept.). A small slender tree of W. Malaysia; in the Peninsula common from Penang to Singapore in open country.

DIPTEROCARPACEÆ.

Dryobalanops aromatica, *Gaertn. fil.* Kanching (Forest Dept.), planted in K. Lumpur and Rawang. A lofty tree of Sumatra, Lingga and Borneo; in the Peninsula not uncommon in the south, usually gregarious.

Dryobalanops oblongifolia, *Dyer.* Rantau Panjang (Forest Dept.). A lofty tree of Borneo; in the Peninsula Kelantan to Johore and from Kinta southwards on the west.

Dipterocarpus cornuta, *Dyer.* Bukit Puteh Forest Reserve (Forest Dept.). A tree of ? Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Dipterocarpus crinita, *Dyer.* Ampang; Batu Caves; Kajang; Weld's Hill. A lofty tree of Sumatra and Borneo; in the Peninsula common in forest.

Dipterocarpus Duperreana, *Dyer.* Ampang; Dusun Tua; Sungai Buloh; Weld's Hill. A lofty tree of Indo-China, Sumatra and Siam; in the Peninsula in forest, Langkawi, Kelantan, Pahang.

Dipterocarpus grandiflora, *Blanco.* Sungai Lallang Forest Reserve (Forest Dept.). A lofty tree of Tenasserim, Lingga, Bangka, Sumatra, Borneo and the Philippines; in the Peninsula common in forest.

Dipterocarpus verrucosa, *Foxworthy.* Kajang (Forest Dept.). A lofty tree of Sumatra and Borneo; in the Peninsula rare in forest, Negri Sembilan.

Anisoptera costata, *Korth.* Bangi Forest Reserve (Forest Dept.). A lofty tree of Tenasserim, Sumatra and Borneo; in the Peninsula not uncommon in forest in the south.

Anisoptera magistocarpa, *van Slooten.* Ulu Gombak (Forest Dept.). A tree of Sumatra; in the Peninsula in forest, Negri Sembilan, Malacca, Botanic Gardens, Singapore.

Anisoptera thurifera, *Bl.* 16½ mile, Ginting Simpak Road (Forest Dept.). A tree of ? Burma, ? Sumatra and the Philippines; in the Peninsula not common in forest, Perak.

Shorea acuminata, *Dyer.* Ampang; Kajang; Kanching; Sungai Buloh. A tall tree of Lingga and Borneo; in the Peninsula in forest from Penang to Malacca.

Shorea bracteolata, *Dyer.* Ampang; Ayer Hitam; Kajang; Kanching; Klang Gates; Sungai Buloh; Weld's Hill. A lofty tree of Sumatra; in the Peninsula not uncommon in forest from Penang to Singapore.

Shorea ciliata, *King.* Kajang (Forest Dept.). A tree, endemic and rare, Penang Hill.

Shorea costata, *King.* Kajang (Forest Dept.). A tree, endemic and rare, Penang.

Shorea Curtisii, *Dyer.* Kajang; Kanching; Ulu Gombak. A tall tree, endemic in forest from Penang to Singapore.

Shorea leprosula, *Miq.* Ampang; Kajang; Sungai Buloh; Weld's Hill. A lofty tree of Sumatra and Borneo; in the Peninsula common in forest from Taiping to Singapore.

Shorea macroptera, *Dyer.* Ampang; Bukit Puteh; Kajang; Kanching. A tree of Borneo; in the Peninsula common in forest from Penang to Singapore.

Shorea ? Maxwelliana, *King.* Kajang (Forest Dept.).

Shorea parvifolia, *Dyer.* Kajang; Kanching; Klang Gates; K. Lumpur; Sungai Buloh. A tall tree, endemic, common in forest from Penang to Singapore.

Shorea pauciflora, *King.* Ulu Gombak (Forest Dept.). A tall tree, endemic, not very common in forest, Penang to Singapore.

Shorea rigida, *Brandis.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Negri Sembilan, Malacca, Singapore.

Shorea sericea, *Dyer.* Kajang (Forest Dept.). A tree of Borneo; in the Peninsula common in forest from Penang to Malacca.

Shorea sp. (Meranti Kait-Kait). Kajang (Forest Dept.). Also collected near Sungkai, Perak.

Shorea sp. 20¼ mile, Ginting Simpak Road (Forest Dept.).

Shorea sp., aff. *Pachychlamys Hemsleyanus*, *Ridl.* Bukit Cheraka Forest Reserve (Forest Dept.).

Pachychlamys Thiseltoni, *Ridl.* Sungai Buloh; Weld's Hill. A tree of Sumatra; in the Peninsula not uncommon in forest from Penang to North Johore.

Hopea globosa, *Brandis.* Rantau Panjang (Ridley). A lofty tree, endemic in forest from Taiping to Johore.

Hopea intermedia, *King.* Bukit Cheraka; Kajang; ? Rantau Panjang; Sungai Lallang. A tree, endemic, not common in forest, Penang and Perak. (Dr. Foxworthy prefers to keep this separate from *H. Pierrei*, *Hance*, with which Mr. Ridley unites it).

Vatica sp. Weld's Hill (Forest Dept. 2935).

Balanocarpus Heimii, *King.* Ampang; Bukit Cheraka; Sungai Lallang. A tree, endemic in forest, Penang to Malacca.

Balanocarpus latifolius, *Brandis.* Kanching (Forest Dept.). A tree of Borneo; in the Peninsula known only from this locality.

Balanocarpus penangianus, *King.* Ampang (Forest Dept.). A tree, endemic in forest, Penang to Malacca.

Pachynocarpus Stapfianus, *King.* Ampang; Bangi. A tall tree of Lower Siam; in the Peninsula not common in forest, Langkawi, Penang and Pahang.

BIXACEÆ, CULTIVATED.

Bixa Orellana, *Linn.* (Arnotto). Cultivated in various localities. A pantropic bush of South American origin.

MALVACEÆ.

Sida carpinifolia, *Linn. fil.* Seminyih; Ulu Gombak. An undershrub, pantropic; in the Peninsula a common weed in waste ground.

Sida rhombifolia, *Linn.* Batang Berjuntai; Klang Gates; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A pantropic undershrub common in the Peninsula on seashores and waste ground.

Urena lobata, *Linn.* Batang Berjuntai; Klang Gates; Pudu; Seminyih; Ulu Gombak. A pantropic undershrub, common in the Peninsula in open places and waste ground.

Hibiscus macrophyllus, *Roxb.* Sungai Buloh; Weld's Hill. A tall tree of India, Indo-China, Siam and Java; in the Peninsula common in forest from Penang to Malacca.

Hibiscus tiliaceus, *Linn.* Pudu (Hume 7716). A small tree, pantropic; in the Peninsula common on seashores and often planted inland.

Bombax larutensis, *Ridl.* Ulu Gombak (Forest Dept., and other collectors). A tall thorny, tree, endemic, not common in forest, Penang, Perak, ? Kelantan, Negri Sembilan.

Durio Lowianus, *Scort.* Sungai Buloh (Forest Dept. 4596). A tree, endemic in forest, Kedah, Perak, Pahang, Negri Sembilan.

Durio malaccensis, *Planch.* K. Lumpur; Ulu Gombak. A tall tree, endemic in forest, Taiping to Malacca.

Durio Oxleyanus, *Griff.* Sungai Buloh (Forest Dept. 4903). A tree, endemic, not common in forest, Dindings, Pahang, Negri Sembilan and Malacca.

Boschia Griffithii, *Mast.* Klang Gates; Sungai Buloh; Ulu Gombak; Weld's Hill. A tree of Sumatra; in the Peninsula common in forest.

Neesia synandra, *Mast.* Weld's Hill (Forest Dept.). A tall tree of Lower Siam; in the Peninsula not uncommon in forest from Penang to Singapore.

Coelostegia Griffithii, *Benth. & Hook. fil.* Sungai Buloh (Forest Dept.). A tall tree, endemic and common in forest from Perak to Singapore.

CULTIVATED MALVACEÆ.

Durio zibethinus, *Linn.* (The Durian). A tree of Indo-China and W. Malaysia, known only in cultivation.

Eriodendron anfractuosum, *DC.* (Kapok). Common in villages, gardens, etc. A pantropic tree, origin probably South India.

Hibiscus esculentus, *Linn.* ("Lady's Fingers"). A tall herb, cultivated as a vegetable in all tropics.

Hibiscus mutabilis, *Linn.* A shrub of Chinese origin, cultivated in all tropics.

Hibiscus rosa-sinensis, *Linn.* Common in gardens. Pantropic in cultivation.

Hibiscus Sabdariffa, *Linn.* (Roselle). K. Lumpur; Serdang. A pantropic shrub, commonly cultivated in the Peninsula.

Hibiscus schizopetalus, *Hook. fil.* Common in gardens. A shrub of Africa, commonly cultivated in the Peninsula.

STERCULIACEÆ.

Sterculia hispidissima, *Ridl.* Ulu Gombak; Weld's Hill. A tree, endemic and rare in forest, doubtfully also from Singapore.

Sterculia laevis, *Wall.* Batu Caves; K. Lumpur; Ulu Gombak. A shrub of Tenasserim, Java and Borneo; in the Peninsula common in forest.

Sterculia macrophylla, *Vent.* Batu Caves; K. Lumpur. A tall tree of Java and Borneo; in the Peninsula common in lowland forest.

Sterculia parviflora, *Roxb.* Ampang; Weld's Hill. A tree of Sylhet, Burma and Cochin-China; in the Peninsula common in forest at low altitudes.

Sterculia parvifolia, *Wall.* K. Lumpur (Forest Dept.). A small tree, endemic and rare in forest, Penang and Taiping.

Sterculia rubiginosa, *Vent.* Sungai Buloh; Weld's Hill. A small tree of Indo-Malaya; in the Peninsula common in open country.

Scaphium affine, *Ridl.* Weld's Hill (Forest Dept.). A tree of ? Indo-China; in the Peninsula common in forest in the south.

Pterocymbium javanicum, *R. Br.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines; in the Peninsula not common in open country, Perlis, Penang, Perak and Malacca.

Erythropsis fulgens, *Ridl.* K. Lumpur (Curtis, Forest Dept.). A tree of Burma, Tenasserim, Sumatra and Java; in the Peninsula not common in forest, Penang, Upper Perak and Kelantan.

Tarrietia perakensis, *King.* K. Lumpur (Forest Dept. 2367). A tree, endemic and rare in forest, Taiping Hills.

Tarrietia simplicifolia, *Mast.* Dusun Tua (Ridley). A lofty tree, endemic and not uncommon in the south.

Pterospermum Blumeanaum, *Korth.* Klang Gates; Sungai Buloh. A tree of Indo-Malaya; in the Peninsula common in forest from Langkawi to Singapore.

Pterospermum diversifolium, *Bl.* Batu Caves; K. Lumpur. A tall tree of Indo-China, Java and the Philippines; in the Peninsula not very common in forest, Kelantan, Perak, Negri Sembilan, Malacca, Singapore.

Melochia corchorifolia, *Linn.* Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Pudu. A small pantropic shrub; a common weed in waste ground all over the Peninsula.

Melochia velutina, *Bedd.* Sungai Buloh (Forest Dept. 2295). A shrub or small tree of Indo-Malaya and Mauritius; in the Peninsula not uncommon in the north in open places.

Abroma augusta, *Linn.* Batu Caves (Ridley). A shrub of Indo-Australia and China; in the Peninsula Upper Perak to Singapore, usually near cultivation or limestone.

Byttneria Jackiana, *Wall.* Batu Tiga (Ridley). A woody climbing shrub, endemic, Penang to Negri Sembilan in forest.

Commersonia platyphylla, *Andr.* K. Lumpur; Petaling. A small tree of Indo-Malaya to the Philippines; in the Peninsula common from Penang to Singapore in secondary growth.

Leptonychia glabra, *Turcz.* Batu Caves; K. Lumpur; Sungai Buloh. A shrub or small tree of Indo-Malaya; in the Peninsula common in forest, often montane or sub-montane.

CULTIVATED STERCULIACEÆ.

Cola acuminata, *S. & E.* (Kola nut). Serdang Experimental Plantation. A tree of Trop. America; in the Peninsula occasionally cultivated.

Muntingia calabura, *Linn.* Cultivated, fide Foxworthy. A tree of the West Indies; in the Peninsula occasionally cultivated.

Theobroma cacao, *Linn.* (Cocoa). A tree of Trop. America, occasionally cultivated in the Peninsula.

TILIACEÆ.

Pentace triptera, *Mast.* K. Lumpur (Forest Dept.). A tall tree, endemic, Taiping to Singapore in forest.

Grewia antidesmæfolia, *King.* Ulu Gombak (Forest Dept.). A small tree of Lower Siam; in the Peninsula not common in forest, Taiping to Johore.

Grewia fibrocarpa, *Mast.* Ulu Gombak; Weld's Hill. A tree, endemic and common in forest from Penang to Malacca and on the East coast islands.

Grewia latifolia, *Mast.* K. Lumpur; Ulu Gombak. A small tree, endemic, not uncommon from Perak to Singapore in forest.

Grewia Miqueliana, *Kurz.* Weld's Hill (Forest Dept.). A small tree, endemic, Taiping to Johore in forest.

Grewia paniculata, *Roxb.* Batang Berjuntai; Klang Gates; K. Lumpur. A small bushy tree of Indo-Malaya to the Philippines and Indo-China; in the Peninsula common as far south as Johore in open country.

Grewia umbellata, *Roxb.* Batu Caves; Bukit Raja; Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh. A climbing shrub of Siam, Java and Borneo; in the Peninsula common in secondary growth.

Elaeocarpus Ganitrus, *Roxb.* Sungai Buloh (Forest Dept.). A tree of Nepal and Assam, doubtfully wild in the Peninsula.

Elaeocarpus glabrescens, *Mast.* K. Lumpur; Ulu Gombak. A tree of Lower Siam; in the Peninsula Kedah Peak, Penang, Selangor, Malacca, in forest usually in hilly localities.

Elaeocarpus Griffithii, *Mast.* Klang Gates; Public Gardens, K. Lumpur. A tree of Tenasserim; in the Peninsula not uncommon in forest in the lowlands.

Elaeocarpus Jackianus, *Wall.* K. Lumpur (Forest Dept.). A tall tree of Borneo; in the Peninsula common in forest on the west coast.

Elaeocarpus Mastersii, *King.* Klang Gates; K. Lumpur. A tree of Borneo; in the Peninsula common in open woody places.

Elaeocarpus obtusus, *Bl.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya; in the Peninsula common from Penang to Singapore in open places and on the seacoast.

Elaeocarpus paniculatus, *Wall.* Ampang; K. Lumpur; Rantau Panjang. A tree of Lower Siam, Bangka and Borneo; in the Peninsula common in lowland forest.

Elaeocarpus parvifolius, *Wall.* Sungai Buloh; Weld's Hill. A tall tree of Lower Siam and Borneo; in the Peninsula common from Penang to Singapore, both in open country and in forest.

Elaeocarpus petiolatus, *Wall.* Batu Caves; K. Lumpur; Sungai Buloh. A small tree of Burma, Sumatra and Borneo; in the Peninsula common from Penang to Singapore in lowland forest.

Elaeocarpus stipularis, *Bl.* Ampang; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh. A tree of W. Malaysia; in the Peninsula common from Kedah to Singapore, usually in lowland forest.

CULTIVATED TILIACEÆ.

Berrya Ammonilla, *Roxb.* Public Gardens, K. Lumpur. A tall tree of India, Ceylon and Burma, occasionally cultivated in the Peninsula.

Corchorus olitorius, *Linn.* (Jute). Cultivated, fide Foxworthy. A native of India, pantropic in cultivation.

Honkenya ficifolia, *Willd.* K. Lumpur (Forest Dept.). A shrub of Trop. Africa, occasionally cultivated in the Peninsula.

GONOSTYLACEÆ.

Gonostylus Maingayi, *Hook. fl.* Ayer Hitam; Klang Gates; Sungai Buloh; Weld's Hill. A large tree, endemic in forest from Penang to Singapore.

LINACEÆ.

Roucheria Griffithiana, *Planch.* Klang Gates; K. Lumpur. A liane of Sumatra and Borneo; in the Peninsula common in lowland forest.

Ixonanthes icosandra, *Jack*. Batang Berjuntai; Klang Gates; Rantau Panjang; Sungai Buloh; Weld's Hill. A small tree of Sumatra; in the Peninsula common from Kedah to Singapore in woods and open country.

Ixonanthes reticulata, *Jack*. Public Gardens and Weld's Hill, K. Lumpur. A shrub of Borneo; in the Peninsula Kedah to Singapore in woods.

CULTIVATED LINACEÆ.

Erythroxylon coca, *Lam.* (Cocaine). Serdang Experimental Plantation. A shrub of S. America; in the Peninsula very occasionally cultivated.

MALPIGHIACEÆ.

Tristellateia australasica, *A. Rich.* K. Lumpur, cultivated (Forest Dept.). A woody climber of W. Malaysia to Polynesia; in the Peninsula wild in tidal swamps and often cultivated.

Hiptage madablota, *Gaertn.* K. Lumpur (Ridley). A liane of Indo-Malaya and China; in the Peninsula perhaps not wild south of Perlis.

Hiptage sericea, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A liane of Lower Siam; in the Peninsula Penang to Singapore in open places and riverbanks.

Aspidopterys concava, *Juss.* K. Lumpur (Ridley). A liane of Burma and Tenasserim; in the Peninsula Penang to Singapore in forest.

Brachylophon Curtisii, *Oliv.* Seminyih (Hume 8168). A shrub or small tree of Sumatra; in the Peninsula rare, Penang, Perak, Mt. Ophir (a var.).

CULTIVATED MALPIGHIACEÆ.

Malpighia coccigera, *Linn.* Public Gardens, K. Lumpur (Forest Dept.). A shrub of the West Indies, cultivated in the Peninsula as an ornamental shrub.

OXALIDACEÆ.

Oxalis corniculata, *Linn.* K. Lumpur; Pudu. A creeping herb, cosmopolitan; in the Peninsula common near houses in waste ground.

Connaropsis monophylla, *Planch.* K. Lumpur; Sungai Buloh. A small tree, endemic, common in open places from Perak to Johore.

CULTIVATED OXALIDACEÆ.

Averrhoa Bilimbi, *Linn.* (The Belimbing). A small tree of Trop. America, cultivated in most tropical countries.

Averrhoa Carambola, *Linn.* (The Carambola). A small tree of Trop. America, pantropic in cultivation.

BALSAMINACEÆ.

Impatiens Ridleyi, *Hook. fil.* Batu Caves on the limestone (all collectors). A small shrubby herb, endemic and local.

RUTACEÆ.

Evodia glabra, *Bl.* Sungai Buloh; Weld's Hill. A tree of Tenasserim, Sumatra and Java; in the Peninsula common in lowland forest from Penang to Singapore.

Evodia latifolia, *DC.* K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A small tree of Lower Siam, Java, Borneo and the Moluccas; in the Peninsula common in forest from Penang to Johore.

Acronychia laurifolia, *Bl.* K. Lumpur (Forest Dept.). A small tree of Indo-Malaya; in the Peninsula common in lowland forest.

Acronychia Porteri, *Hook. fil.* K. Lumpur (Weld's Hill and in the Public Gardens). A tree of Lower Siam; in the Peninsula in forest from Penang to Singapore and on the East coast.

Glycosmis malayana, *Ridl.* Klang Gates; Seminyih; Ulu Gombak; Weld's Hill. A shrub, endemic, common from Langkawi to Singapore in lowland forest.

Glycosmis monticola, *Ridl.* Seminyih (Hume). A shrub, endemic and rare, Gunong Angsi and Mt. Ophir.

Micromelum hirsutum, *Oliv.* Sungai Buloh; Ulu Gombak. A shrub or small tree of Indo-Malaya to the Philippines; in the Peninsula not uncommon in open country from Penang and Kelantan to Mt. Ophir.

Micromelum pubescens, *Bl.* Klang Gates (cultivated here by Tamils, fide Forest Dept.). A shrub or small tree of Indo-Australia and China; in the Peninsula common in open country.

Merrillia caloxylon, *Swingle.* Weld's Hill (Forest Dept. 5186). A bush or tree of Lower Siam; in the Peninsula not common, Patani, Upper Perak and Pahang, in forest and near rivers.

CULTIVATED RUTACEÆ.

Aegle marmelos, *Correa.* (Bael fruit). A native of India, seldom cultivated in the Peninsula.

Citrus aurantium, *Linn.* (The Orange). Cultivated, as it is in most tropics and subtropics.

Citrus decumana, *Murr.* (The Pumelo). A tree, native of W. Malaysia to Polynesia, cultivated throughout Indo-Malaya.

Citrus medica, *Linn.*, var. *acida*, *Hook. fil.* (The Lime). A small tree of Trop. Asia, cultivated in all tropics.

Feronia elephantum, *Correa*. (Wood Apple). K. Lumpur (Agri. Dept.). A spiny tree of Indo-Malaya, not often cultivated in the Peninsula.

Murraya exotica, *Linn.* Circular Rd. Plantation and Weld's Hill, cultivated (Forest Dept.). A shrub or small tree of Indo-Australia and China; in the Peninsula wild on limestone, and often cultivated as an ornamental shrub.

Triphasia trifoliata, *DC.* K. Lumpur (Forest Dept.). A small shrub, probably of Chinese origin, cultivated throughout Indo-Malaya.

SIMARUBACEÆ.

Brucea sumatrana, *Roxb.* K. Lumpur (Ridley). A shrub of Indo-Australia; in the Peninsula common in open places.

Eurycoma apiculata, *Benn.* Petaling; Weld's Hill. A shrub, endemic, Penang to N. Johore, commonest in the north, in forest.

Eurycoma longifolia, *Jack.* Rantau Panjang (Hume). A shrub or small tree of Indo-Malaya; in the Peninsula common in forest.

Irvingia malayana, *Oliv.* K. Lumpur (Forest Dept.). A lofty tree of Burma and Siam; in the Peninsula Negri Sembilan, Malacca, Singapore, in forest.

OCHNACEÆ.

Gomphia oblongifolia, *Ridl.* Klang Gates; K. Lumpur. A tree of Tenasserim and Borneo; in the Peninsula common from Kedah to Singapore.

CULTIVATED OCHNACEÆ.

Ochna Wallichii, *Planch.* K. Lumpur, in the Public Gardens (Forest Dept.). A shrub of Burma, Tenasserim and Lower Siam; in the Peninsula cultivated only.

BURSERACEÆ.

Triomma malaccensis, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Sumatra; in the Peninsula Selangor, Malacca, Singapore in forest.

Canarium caudatum, *King.* K. Lumpur; Rantau Panjang. A tree of Sumatra; in the Peninsula not common, Penang, Perak and Singapore in lowland forest.

Canarium grandiflorum *Benn.* Weld's Hill (Forest Dept.). A tree, endemic and not common in forest, Malacca and Singapore.

Canarium kadondon, *Benn.* Weld's Hill (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Canarium nitidum, *Benn.* Weld's Hill (Forest Dept.). A small tree, endemic, Perak to Singapore, usually in forest but often in open country.

Canarium pilosum, *Benn.* K. Lumpur (Weld's Hill and Damansara Hill). A tree, endemic, Penang to Singapore, in forest.

Canarium rufum, *Benn.* Weld's Hill (Forest Dept.). A tree, endemic, Upper Perak to Singapore, in forest.

Santiria apiculata, *Benn.* Batang Berjuntai; Bukit Raja; Kanching; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree, endemic and common in lowland forest from Taiping to Singapore.

Santiria fasciculata, *Benn.* Weld's Hill (Forest Dept.). A tall tree, endemic, Penang to Malacca, in forest.

Santiria floribunda, *King.* K. Lumpur (Ridley). A small tree, endemic, not common in forest, Perak and Pahang.

Santiria laevigata, *Bl.* K. Lumpur; Ulu Gombak. A tall tree of Sumatra; in the Peninsula common in lowland forest from Taiping to Singapore.

Santiria laxa, *King.* Sungai Buloh; Weld's Hill. A tree, endemic and common in forest from Penang to Singapore.

Santiria multiflora, *Benn.* K. Lumpur; Sungai Buloh. A tree of Borneo; in the Peninsula in marshy forest from Taiping to Singapore.

Santiria Wrayi, *King.* Kajang; Kanching. A tree, endemic, Taiping to Johore on the west coast.

Icicaster Planchoni, *Ridl.* K. Lumpur (Weld's Hill and the Public Gardens). A tree, endemic, Taiping to Singapore in forest.

MELIACEÆ.

Turraea breviflora, *Ridl.* Kanching, on limestone (Ridley). A shrub, endemic and rare, Ulu Selangor and Singapore.

Chisocheton glomeratus, *Hiern.* Batu Caves; K. Lumpur; Ulu Gombak. A tall tree, endemic, not common, Perak to Negri Sembilan, in forest.

Chisocheton macrophyllus, *King.* Batu Caves (Curtis). A tree of Java; in the Peninsula not common in forest, Penang, Selangor, Singapore.

Chisocheton princeps, *Hemsl.* Sungai Buloh (Forest Dept.). A tree, endemic and rare, Penang.

Chisocheton spicatus, *Hiern*. Klang Gates (Forest Dept.). A tree of Sumatra and Borneo; in the Peninsula Penang to Singapore in forest.

Dysoxylum arborescens, *Miq.* Klang Gates (Forest Dept.). A small tree of Tenasserim to Celebes; in the Peninsula Perak, Pahang, Malacca, in lowland forest.

Dysoxylum cauliflorum, *Hiern*. Weld's Hill (Forest Dept.). A tree of Borneo (a var.) and the Philippines; in the Peninsula Penang to Singapore in forest.

Dysoxylum costulatum, *Miq.* Dusun Tua (Ridley). A tree of Sumatra; in the Peninsula common in forest.

Dysoxylum dumosum, *King*. Seminyih (Hume). A shrub, endemic, Perak to Johore in forest.

Dysoxylum flavescens, *Hiern*. K. Lumpur (Forest Dept.). A tree, endemic, not common in forest, Penang, Malacca and Singapore.

Dysoxylum macrothyrsus, *Miq.* Batang Berjuntai; K. Lumpur; Sungai Buloh (var. *microbotrys*, *Ridl.*). A tree of Java and Borneo; in the Peninsula Taiping to Singapore in forest.

Dysoxylum thrysoideum, *Griff.* Sungai Buloh (Forest Dept.). A tall tree of Borneo; in the Peninsula common in forest.

Dysoxylum turbinatum, *King*. Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra; in the Peninsula common in forest in the south.

Amoora Maingayi, *Hiern*. Weld's Hill (Forest Dept.). A small tree, endemic, rare and little known, Taiping and Malacca.

Aphanamixis Rohituka, *Pierre*. K. Lumpur; Sungai Buloh; Ulu Gombak; Weld's Hill. A tree of India to Sumatra and China; in the Peninsula common in forest.

Aglaia cordata, *Hiern*. Bukit Tunggal Forest Reserve (Forest Dept.). A small tree of Borneo; in the Peninsula common in forest.

Aglaia glabriflora, *Hiern*. Ayer Hitam Forest Reserve; Weld's Hill. A small tree, endemic, not uncommon in the south in open places.

Aglaia Griffithii, *Kurz*. Sungai Buloh (Forest Dept.). A tree of Tenasserim; in the Peninsula common in forest from Penang to Singapore.

Aglaia Hiernii, *King*. Klang Gates; Ulu Gombak. A tall tree, endemic, Perak and Malacca, in forest.

Aglaia odoratissima, *Bl.* Seminyih; Ulu Gombak; Weld's Hill. A tree of Siam, Sumatra and Java; in the Peninsula common in lowland forest.

Aglaia oligophylla, *Miq.* Weld's Hill (Forest Dept.). A small tree of Burma and Sumatra; in the Peninsula not common in forest, Perak, Malacca, Johore and Singapore.

Aglaia palembanica, *Miq.* Ulu Gombak. A shrub or small tree of Sumatra, Bangka and Borneo; in the Peninsula common in forest.

Aglaia tenuicaulis, *Hiern.* Dusun Tua; Seminyih; Ulu Gombak; Weld's Hill. A shrub or small tree of Sumatra; in the Peninsula Penang to Negri Sembilan, in forest.

Aglaia trichostemon, *C. DC.* K. Lumpur (Forest Dept.). A small tree of Borneo; in the Peninsula common in lowland forest.

Lansium domesticum, *Jack.* Batu Caves; K. Lumpur; Weld's Hill (var. *pubescens*, *Koorders*). A small tree of W. Malaysia; in the Peninsula common, cultivated and wild.

Walsura multijuga, *King.* Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra, Bangka, Borneo, and the Philippines; in the Peninsula Penang to Singapore in forest.

Walsura villosa, *Wall.* Ulu Gombak (Forest Dept.). A small tree of Tenasserim, Siam and Indo-China; in the Peninsula rare, Perak, Pahang, Malacca.

CLUTIVATED MELIACEÆ.

Aglaia odorata, *Lour.* K. Lumpur. A shrub of China; in the Peninsula cultivated only.

Melia Azedarach, *Linn.* K. Lumpur. A small tree of India; in the Peninsula occasionally cultivated.

CHAILLETIACEÆ.

Chaillietia Griffithii, *Hook. fil.* Ampang; Batang Berjuntai; Batu Caves; Dusun Tua; Klang Gates; Seminyih; Ulu Gombak. A shrub, endemic, not uncommon in forest from Perak to Malacca.

OLACACEÆ.

Harmandia Kunstleri, *King.* Batu Caves (Ridley). A tree, endemic, not common in forest, Perak, Malacca.

Ochanostachys amentacea, *Mast.* Ampang; Kajang, K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A tree of Tenasserim, Bangka, Lingga and Borneo; in the Peninsula common in forest from Penang to Singapore.

Ctenolophon parvifolius, *Oliv.* Seminyih (Hume). A tree of Sumatra and Borneo; in the Peninsula common in forest.

Strombosia javanica, *Bl.* Batu Caves; Batu Tiga; Weld's Hill. A small tree of Tenasserim and W. Malaysia; in the Peninsula Penang to Singapore in forest.

Strombosia rotundifolia, *King*. Kajang (Forest Dept.). A shrub, endemic, not common in forest, Taiping to Singapore.

Gomphandra affinis, *Mast*. Batu Caves; Dusun Tua; K. Lumpur; Rawang; Seminyih; Sungai Buloh. A shrub of Moulmein; in the Peninsula common in forest.

Gomphandra gracilis, *King*. Ulu Gombak (Hume 9693). A shrub or small tree, endemic, rare, Perak at Larut and Chandleriang.

Gomphandra lanceolata, *King*. Klang Gates; Petaling; Seminyih; Ulu Gombak. A shrub, endemic and common in forest, usually at some altitude.

Gomphandra Maingayi, *King*. Ulu Gombak (Hume). A shrub, endemic, not common in montane forest, Penang, Pahang.

Gomphandra pubescens, *Ridl*. Weld's Hill (Ridley). A shrub, endemic and local.

Stemonurus capitatus, *Becc*. Weld's Hill (Forest Dept.). A small tree, endemic, not very common in forest, Langkawi to Johore.

Stemonurus scorpioides, *Becc*. Sungai Buloh (Forest Dept.). A tree of Sumatra and Java; in the Peninsula Perak, Johore, Singapore.

Gonocaryum longe-racemosum, *King*. Batu Caves; Kajang; Kanching; Ulu Gombak. A shrub of Lower Siam; in the Peninsula Perak to Singapore in lowland forest.

Phytocrene palmata, *Wall*. K. Lumpur (Ridley). A long climbing shrub, endemic in forest, Penang, Taiping and Malacca.

Lophopyxis Maingayi, *Hook. fil*. Batu Tiga (Ridley). A climbing shrub, endemic, not common in forest, Taiping to Malacca.

ILICACEÆ.

Ilex macrophylla, *Wall*. Carcosa Domain; ? Weld's Hill. A tree of Mergui, Sumatra and Java; in the Peninsula not common in open places, Penang, Malacca and Singapore.

Ilex Maingayi, *Hook. fil*. K. Lumpur (Forest Dept.). A tree, endemic, not very common in forest, Penang to Singapore.

CELASTRACEÆ.

Microtropis filiformis, *King*. Sungai Buloh (Ridley). A shrub or small tree of Burma and Lower Siam; in the Peninsula not uncommon in forest in the north.

Euonymus javanicus, *Bl.* Batu Caves (Ridley). A shrub of Burma, Sumatra and Java; in the Peninsula common in forest from Langkawi to Negri Sembilan.

Glyptopetalum quadrangulare, *Prain.* Seminyih (Hume 8191). A shrub, endemic, not common, usually in montane forest, Perak, Pahang, Selangor.

Lophopetalum oblongifolium, *King.* K. Lumpur (Curtis 3771). A tall tree of Sumatra; in the Peninsula rare, Perak.

Kurrimia paniculata, *Wall.* Bukit Tunggal; K. Lumpur; Rawang; Sungai Buloh. A tree of Lower Siam, Sumatra and Borneo; in the Peninsula common in lowland forest.

Hippocratea nigricaulis, *Ridl.* Rawang (Ridley). A slender climber of Burma and Lower Siam; in the Peninsula Penang to Johore, usually in forest.

Salacia flavescens, *Kurz.* Batu Caves; Seminyih; Ulu Gombak. A scandent shrub or bush of Tenasserim and Siam; in the Peninsula common in open country and in forest.

Salacia grandiflora, *Kurz.* Ulu Gombak (Hume). A shrub of Tenasserim; in the Peninsula very common from Penang to Singapore, usually in open country.

RHAMNACEÆ.

Zizyphus calophylla, *Wall.* K. Lumpur (Ridley). A strong thorny climber of Bangka and Borneo; in the Peninsula common in forest.

Zizyphus oenoplia, *Mill.* Batu Caves; Rawang; A thorny bush of Tropical Africa and Australia; in the Peninsula common in open country.

Zizyphus sp. Top of the Batu Caves (Ridley, Kelsall).

Ventilago malaccensis, *Ridl.* Ulu Gombak (Forest Dept.). A climbing shrub of Lower Siam and Borneo; in the Peninsula common from Langkawi to Singapore in open places.

Ventilago oblongifolia, *Bl.* Batu Caves; Weld's Hill. A strong climber of Java and the Philippines; in the Peninsula in forest from Taiping to Singapore.

Gouania javanica, *Miq.* Batu Caves; K. Lumpur; Ulu Langat; Weld's Hill. A climbing shrub of Sumatra and Java; in the Peninsula Perlis and Kelantan to Malacca, in open places.

CULTIVATED RHAMNACEÆ.

Zizyphus jujuba, *Lam.* (The jujube). K. Lumpur (Agri. Dept.). A small tree of Indo-Malaya; sparingly cultivated in the Peninsula.

AMPELIDACEÆ.

Vitis cantoniensis, *Seem.* Batu Tiga; Petaling; Ulu Gombak. A slender vine of Indo-China and China; in the Peninsula not very common in open places, Taiping to Johore.

Vitis cinnamomea, *Wall.* Batang Berjuntai; Klang Gates; K. Lumpur; Seminyih; Sungai Buloh. A vine, endemic, common in lowland forest.

Vitis furcata, *Laws.* Batu Caves; Bukit Raja; Seminyih; Ulu Gombak. A vine of Sumatra; in the Peninsula Penang to Singapore in forest.

Vitis glaberrima, *Wall.* Batu Caves (Ridley). A vine of Tenasserim, Lower Siam, Sumatra and Bangka; in the Peninsula Penang to Singapore, in forest.

Vitis gracilis, *Wall.* Sungai Buloh (Ridley). A slender vine of Sumatra and Borneo; in the Peninsula common.

Vitis hastata, *Miq.* Batu Caves; Klang Gates; K. Lumpur. A vine of W. Malaysia; in the Peninsula common in open places from Langkawi to Singapore.

Vitis japonica, *Thunb.* Batang Berjuntai; Petaling; Rantau Panjang; Rawang. A slender vine of Java, China, Japan and Australia; in the Peninsula common in open places and secondary growth from Penang and Kelantan to Singapore.

Vitis lanceolaria, *Wall.* Batu Caves (Ridley). A vine of India, Lower Siam, Sumatra and Java; in the Peninsula common in forest and on riverbanks from Perlis to Negri Sembilan.

Vitis Lawsoni, *King.* K. Lumpur; Seminyih; Ulu Gombak. A liane of Burma; in the Peninsula Penang to Singapore in lowland forest.

Vitis macrostachya, *Miq.* Bukit Raja; Rawang; Seminyih; Ulu Gombak. A long climber of Sumatra; in the Peninsula common in open places.

Vitis mollissima, *Wall.* Bukit Raja; Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A vine of Lower Siam; in the Peninsula common, usually in open places.

Vitis peduncularis, *Wall.* K. Lumpur; Ulu Gombak. A woody vine of Sumatra and Borneo; in the Peninsula Penang and Kelantan to Johore, usually in hill forest.

Vitis polystachya, *Wall.* K. Lumpur; Rantau Panjang. A vine of Siam and Sumatra; in the Peninsula not uncommon in forest, Penang to Johore.

Vitis pyrrhodasys, *Miq.* Seminyih (Hume). A slender vine of W. Malaysia; in the Peninsula common in open places.

Vitis repens, *Wight & Arnott.* Batu Caves; Ulu Gombak. A vine of S. E. Asia; in the Peninsula common in open places and hedges.

Vitis Scortechinii, *King*. Batu Caves (Curtis 3775). A slender vine, endemic, not common, Kelantan and Perak.

Vitis ? trifolia, *Linn.* Dusun Tua (Ridley).

Vitis Wrayi, *King*. Batu Caves; Dusun Tua; A slender vine of Lower Siam; in the Peninsula Penang to Johore, usually in hill forest.

Pterisanthes cissoides, *Bl.* Dusun Tua; Seminyih; Ulu Gombak. A climber of W. Malaysia; in the Peninsula Perak and the Dindings to N. Johore, in thin forest.

Pterisanthes coriacea, *Korth.* K. Lumpur; Petaling; Rawang; Sungai Buloh; Ulu Gombak. A slender climber of Lower Siam, Sumatra and Borneo; in the Peninsula common south of the Taiping Hills in forest.

Pterisanthes rufula, *Planch.* Batu Caves; Dusun Tua; Petaling; Seminyih; Sungai Buloh. A climber of Sumatra; in the Peninsula not common in open places, Perak, Malacca.

Leea angulata, *Korth.* Rawang (Goodenough). A thorny tree of Java; in the Peninsula common in open dry places from Upper Perak and Kelantan to Singapore.

Leea gigantea, *Griff.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur; Seminyih. A large bush, endemic and common in open country.

Leea sambucina, *Willd.* Damansara Hill; K. Lumpur. A big shrub of India to Sumatra; in the Peninsula common in open country.

Leea saxatilis, *Ridl.* Batu Caves (Curtis, Ridley). A herb, endemic, usually on limestone, Langkawi to Pulau Tioman.

Leea sunaica, *Miq.* Ulu Gombak (Hume). A small tree of Java. Borneo; Celebes and Papua; in the Peninsula rare in forest, Gunong Bubu (Perak).

CULTIVATED AMPELIDACEÆ.

Vitis discolor, *Dalz.* Cultivated, fide Foxworthy. A slender vine of Indo-Malaya and Indo-China; in the Peninsula cultivated and wild on limestone in the north.

SAPINDACEÆ.

Allophylus fulvinervis, *Bl.* Rantau Panjang (Kloss, fide Ridley). A small tree of Tenasserim to Java; in the Peninsula not common in forest, Perak, Pahang, Selangor, Malacca.

Allophylus glaber, *Wall.* Batu Caves; K. Lumpur. A small tree, endemic and common in forest from Langkawi to Johore.

Erioglossum edule, *Bl.* K. Lumpur (Forest Dept.). A tall tree of Indo-Australia; in the Peninsula Langkawi to Singapore, common in open country.

Aphania paucijuga, *Radlk.* Rawang. Weld's Hill. A tree, endemic, not uncommon in forest from Penang to Malacca.

Lepisanthes Scortechinii, *King.* Klang Gates (Hume). A tree of Lower Siam; in the Peninsula rare in forest, Langkawi, Kedah, Perak, Dindings (var.), Johore.

Otophora imbricata, *Bl.* Public Gardens, K. Lumpur (Forest Dept.). A small tree of Borneo; in the Peninsula rare, Pahang.

Otophora resecta, *Radlk.* Weld's Hill (Forest Dept.). A small tree of Lower Siam; in the Peninsula not common in forest, Penang and Pahang.

Xerospermum intermedium, *Radlk.* Bangi; Ulu Gombak; Weld's Hill. A tree of Burma; in the Peninsula common in forest from Penang to Singapore.

Nephelium eriopetalum, *Miq.* Batu Caves; K. Lumpur. A tall tree of Sumatra; in the Peninsula Penang to Singapore in lowland forest.

Nephelium glabrum, *Noronh.* K. Lumpur; Sungai Buloh. A tree of ? W. Malaysia; in the Peninsula Perak to Singapore in lowland forest.

Nephelium hamulatum, *Radlk.* K. Lumpur (Forest Dept.). A tree, ? endemic, not common in forest, Dindings and Malacca.

Nephelium pallens, *Radlk.* Batang Berjuntai (Hume 7526). A tree, endemic, not common, Perak and Malacca.

Nephelium ophioides, *Radlk.* Weld's Hill (Forest Dept.). A tall tree, endemic, Perak and Malacca.

Pometia alnifolia, *Radlk.* K. Lumpur; Sungai Buloh; Ulu Gombak. A tree, endemic, Penang to Singapore in forest.

Pometia pinnata, *Forst.* Dusun Tua; Klang Gates; Sungai Buloh; Weld's Hill. A tree of Malaya to Polynesia; in the Peninsula common on riverbanks from Penang and Upper Perak to Johore.

Napeodendron altissimum, *Ridl.* Ulu Gombak (Ridley). A tall tree, endemic and local.

Arytera littoralis, *Bl.* K. Lumpur. A tree of Indo-Malaya to the Philippines; in the Peninsula in tidal swamps and on riverbanks from Perak to Singapore.

Mischocarpus sumatranus, *Bl.* K. Lumpur; Sungai Buloh. A tree of Indo-Malaya and Indo-China; in the Peninsula not common in lowland forest, Penang, Kelantan, Perak and Singapore.

CULTIVATED SAPINDACEÆ.

Nephelium lappaceum, *Linn.* (The Rambutan). A tree of W. Malaysia, widely cultivated in the Peninsula and occurring as an escape.

Nephelium malaiense, *Griff.* Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic and common in villages, etc.

Nephelium mutabile, *Bl.* (The Pulasan). Weld's Hill (Forest Dept.). A tree of W. Malaysia to the Philippines; in the Peninsula commonly cultivated.

STAPHYLEACEÆ.

Turpinia latifolia, *Wall.* K. Lumpur; Sungai Buloh. A tree, endemic, common in forest in the lowlands.

SABIACEÆ.

Meliosma elliptica, *Hook. fl.* K. Lumpur. A small tree of Sumatra and Java; in the Peninsula Taiping to Singapore in lowland forest.

Meliosma lancifolia, *Hook. fl.* Weld's Hill (Forest Dept.). A small tree, endemic, not common in forest, Penang and Perak.

Meliosma nitida, *Bl.* Klang Gates; Petaling; Ulu Gombak. A shrub or small tree of Sumatra and Java; in the Peninsula in forest from Penang to Johore.

ANACARDIACEÆ.

Buchanania sessilifolia, *Bl.* Bukit Cheraka; Klang Gates; K. Lumpur; Rawang; Sungai Buloh. A tree of Indo-Malaya; in the Peninsula common in forest.

Mangifera foetida, *Lour.* K. Lumpur (Forest Dept.). A tall tree of Siam and W. Malaysia; in the Peninsula common in cultivated ground in the south.

Gluta virosa, *Ridl.* Rantau Panjang (Ridley). A tall tree, endemic, Penang, Perak, Dindings, in forest.

Melanorrhoea aptera, *King.* Klang Gates (Forest Dept.). A tree, endemic, not very common in forest, Penang, Perak, Pahang.

Melanorrhoea Wallichii, *Hook. fl.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Borneo; in the Peninsula not uncommon in forest in the south.

Swintonia Schwenkii, *Teys. & Binn.* Klang Gates; Ulu Gombak. A tree of Burma, Sumatra, Borneo (var.) and Indo-China; in the Peninsula not common in forest, Pahang, Negri Sembilan and Malacca.

Swintonia spicifera, *Hook. fil.* Ulu Gombak (Forest Dept.). A tree, endemic, not uncommon in forest as far south as Mt. Ophir.

Camposperma auriculata, *Hook. fil.* Ampang (the species and var. *Wallichii*, *Ridl.*); Bangi (var. *Wallichii*); K. Lumpur (the species and var. *Wallichii*); Kajang (var. *Wallichii*); Rantau Panjang. A tall tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Microstemon velutina, *Engl.* Weld's Hill (Forest Dept.). A tall tree, endemic, Perak, Pahang, Negri Sembilan, Malacca, in forest.

Pentaspadon officinalis, *Holmes.* Kanching; Sungai Buloh; Weld's Hill. A tall tree, endemic, not common in forest, Perak, Negri Sembilan and Malacca.

Melanochyla angustifolia, *Hook. fil.* Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Penang, Taiping, Negri Sembilan, Malacca.

Melanochyla rugosa, *King.* Ayer Hitam Forest Reserve; Sungai Buloh; Ulu Gombak. A tall tree, endemic, rare in forest, Tapah (Perak), Temerloh (Pahang).

Melanochyla tomentosa, *Hook. fil.*, var. *glabrescens*, *Koorders.* Bukit Cheraka (Forest Dept.). A tree, the species of Java, the var. endemic and local.

? *Melanochyla torquata*, *King.* Sungai Buloh (Forest Dept.), leaf specimens only.

Semecarpus Curtisii, *King.* Sungai Buloh (Forest Dept.). A tree of Siam; in the Peninsula Setul to Negri Sembilan, usually in open places.

Semecarpus velutina, *King.* Klang Gates (Forest Dept.). A tree, endemic, rare in forest, Gunong Bubu (Perak) and Johore.

Dracontomelum mangiferum, *Bl.* Sungai Buloh; Weld's Hill. A tree of Indo-Malaya; in the Peninsula on riverbanks from Penang and Upper Perak to Singapore, probably planted in some localities.

CULTIVATED ANACARDIACEÆ.

Anacardium occidentale, *Linn.* (The Cashew-nut). A straggling tree of South America; in the Peninsula cultivated and run wild.

Bouea macrophylla, *Griff.* K. Lumpur; Serdang. A bushy tree of Java and Borneo; in the Peninsula common in villages.

Bouea microphylla, *Griff.* K. Lumpur (Agri. Dept.). A bushy tree of Malaysia; in the Peninsula cultivated and perhaps also wild.

Mangifera caesia, *Jack.* K. Lumpur (Agri. Dept.). A tall tree of W. Malaysia; common in the Peninsula in villages.

Mangifera indica, *Linn.* (The Mango). A tree of South India; in the Peninsula often cultivated.

Mangifera odorata, *Griff.* (Kwini). K. Lumpur (Agri. Dept.). A tall tree of W. Malaysia; in the Peninsula cultivated and wild.

CONNARACEÆ.

Connarus ellipticus, *King.* K. Lumpur (Curtis), and in the Public Gardens. A sarmentose shrub, endemic, Penang to Singapore, common in open places.

Connarus ferrugineus, *Jack.* Rantau Panjang (Ridl.). A shrub or climber of Lower Siam and Sumatra; in the Peninsula in open places from Penang to Singapore.

Connarus oligophyllus, *Wall.* Batu Caves (Ridley). A scandent shrub of Lower Siam; in the Peninsula Penang to Singapore in open places and edges of forest.

Connarus semidecandrus, *Jack.* K. Lumpur; Rawang. A sarmentose shrub of Siam; Tenasserim and Sumatra; in the Peninsula common in open country.

Ellipanthus Griffithii, *Hook. fil.* Kanching (Forest Dept.). A climber of Borneo; in the Peninsula Perak, Malacca, Singapore, in forest.

Rourea fulgens, *Planch.* K. Lumpur (Forest Dept.). A climbing shrub, endemic and rare, Singapore.

Rourea rugosa, *Planch.* Klang Gates (Ridley). A liane, endemic and common in forest.

Rourea similis, *Bl.* K. Lumpur; Seminyih. A liane of Sumatra and Borneo; in the Peninsula common in forest.

Roureopsis pubinervis, *Planch.* Dusun Tua; K. Lumpur; Sungai Buloh. A climbing shrub of Java; in the Peninsula Kedah to Malacca in forest.

Agelaea vestita, *Hook. fil.* K. Lumpur; Sungai Buloh. A big liane of W. Malaysia; in the Peninsula common in forest.

Cnestis ramiflora, *Griff.* K. Lumpur (Forest Dept.). A sarmentose shrub of Indo-Malaya; in the Peninsula common in open country.

LEGUMINOSÆ.

Abrus precatorius, *Linn.* K. Lumpur (Forest Dept.). A slender climber, cosmopolitan; in the Peninsula common in open dry places.

Abrus pulchellus, *Wall.* Batu Caves (Ridley). A slender climber of S. Africa and S. E. Asia; in the Peninsula Langkawi to Negri Sembilan and Pahang.

Crotolaria Saltiana, *Andr.* K. Lumpur; Ulu Gombak. A small shrub, pantropic; in the Peninsula common from Perlis to Singapore, usually in waste ground.

Flemingia strobilifera, *R. Br.* K. Lumpur (Ridley). A small shrub of S. E. Asia; in the Peninsula common in open dry places.

Vigna parviflora, *Ridl.*, non *Welw. Flor. Trop. Africa*, Vol. II, p. 291. Ulu Gombak (Hume). A slender twiner, endemic, Upper Perak to Negri Sembilan, in sandy places.

Clitoria cajanifolia, *Benth.* K. Lumpur; Seminyih. A shrub of South America, introduced into the Peninsula and now common by roadsides in the south.

Dioclea javanica, *Benth.* Batu Tiga; K. Lumpur. A liane of Burma, Ceylon and Java; in the Peninsula not common, Perak.

Pueraria phaseoloides, *Benth.* Batu Caves; Seminyih. A slender twiner of S. E. Asia; in the Peninsula common from Perlis to Negri Sembilan in secondary growth.

Mucuna acuminata, *Grah.* Batu Caves (Ridley). A slender climber of Java; in the Peninsula not very common in secondary growth, Penang, Perak and Singapore.

Tephrosia purpurea, *Pers.* Kajang (Ridley). A small shrub of S. E. Asia; in the Peninsula in waste ground, perhaps introduced.

Tephrosia subamoena, *Prain.* K. Lumpur (Hume). A herb of North India; in the Peninsula common in waste ground.

Millettia albiflora, *Prain.* Kanching; Klang Gates; K. Lumpur; Petaling. A tree, endemic, Penang to Malacca in forest.

Millettia Hemsleyana, *Prain.* Klang Gates (Ridley). A tree, endemic, Upper Perak to Negri Sembilan, in forest.

Millettia sericea, *Benth.* K. Lumpur; Serdang. A liane of W. Malaysia; in the Peninsula common from Penang to N. Johore in forest and secondary growth.

Adinobotrys atropurpureus, *Dunn.* Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Burma, Tenasserim, Sumatra and Borneo; in the Peninsula common in forest and secondary growth.

Dalbergia stercoracea, *Maing.* K. Lumpur (Forest Dept.). A climbing shrub of Sumatra; in the Peninsula common in open places from Penang and Kelantan to Singapore.

Pongamia glabra, *Vent.* Kanching; Rawang. A tree of Trop. Asia and Australia; in the Peninsula common on seashores and sandy places.

Derris elegans, *Benth.* Ulu Gombak; Weld's Hill. A slender liane of Tenasserim to the Philippines; in the Peninsula Perak and Malacca, not very common in forest.

Derris thyrsiflora, *Benth.* K. Lumpur; Ulu Gombak. A bush of Tenasserim, Sumatra and Java; in the Peninsula common from Kedah to Singapore in open country.

Uraria crinita, *Desv.* Batu Caves; Rantau Panjang. A small shrub of the tropics of the Old World; in the Peninsula common in open places.

Uraria lagopoides, *DC.* Batu Caves (Ridley). A small shrub of Indo-Malaya, Indo-China and China; in the Peninsula common in open sandy places.

Alysicarpus vaginalis, *DC.* K. Lumpur (Hume). A herb of the tropics of the Old World; in the Peninsula in dry open places apparently not very common.

Desmodium capitatum, *DC.* Open country near Batu Caves (Ridley). A small creeping shrub of Tropical Asia; in the Peninsula in open country in the north.

Desmodium polycarpum, *DC.* Rantau Panjang (Hume). A small erect shrub of Africa, Asia and Polynesia; in the Peninsula common in open country and grassy places.

Desmodium triflorum, *DC.* Ulu Gombak (Hume). A small diffuse herb, cosmopolitan; common on roadsides and in grass over the whole Peninsula.

Desmodium trifoliatum, *Miq.* Ulu Gombak (Hume). A small creeping shrub of Java to New Guinea; in the Peninsula not common in forest, Upper Perak to Negri Sembilan.

Ormosia nitida, *Prain.* Weld's Hill (Forest Dept.). A tree, endemic and rare, Gopeng (Perak).

Ormosia sumatrana, *Prain.* Weld's Hill (Forest Dept.). A tall tree of Sumatra; in the Peninsula not common, Penang, Kuantan (Pahang), Malacca.

Cassia alata, *Linn.* Common round K. Lumpur. A large shrub, pantropic, of South American origin; in the Peninsula common in waste ground.

Cassia glauca, *Lam.* K. Lumpur; Serdang (cultivated). A shrub or small tree of S. E. Asia; in the Peninsula doubtfully wild.

Cassia hirsuta, *Linn.* Batu Caves; Ulu Gombak; Weld's Hill. An introduced South American weed, not very common in the Peninsula in waste ground.

Cassia nodosa, *Ham.* Klang Gates; K. Lumpur. A tree of Indo-Malaya and Indo-China; in the Peninsula common in forest from Penang and Upper Perak to Malacca.

Cassia obtusifolia, *Linn.* K. Lumpur; Pudu; Seminyih; Ulu Gombak. A herb of S. American origin, now naturalised in S. E. Asia; in the Peninsula common in waste ground.

Cassia occidentalis, *Linn.* Batang Berjuntai; Ulu Gombak. A small shrub, pantropic, of S. American origin; in the Peninsula common in waste ground.

Cassia timoriensis, *DC.*, var. *xanthocoma*, *Miq.* Batu Caves; Public Gardens, K. Lumpur. A small tree of Tenasserim to the Philippines; in the Peninsula common on or near limestone.

Cassia Tora, *Linn.* Rantau Panjang; Weld's Hill. A herb or small shrub, pantropic, native of S. America; in the Peninsula not common in waste ground.

Koompassia malaccensis, *Benth.* Kanching; Rantau Panjang; Sungai Buloh; Ulu Gombak. A lofty tree of Sumatra; in the Peninsula common in forest from Panang to Singapore.

Dialium indum, *Linn.* Sungai Buloh (Forest Dept.). A tree of Java; in the Peninsula on riverbanks from Penang to the Pahang River.

Dialium laurinum, *Baker.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Pahang, Selangor, Malacca and Singapore, in forest.

Dialium Maingayi, *Baker.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Penang to Singapore, in forest.

Dialium platysepalum, *Baker.* K. Lumpur (Forest Dept.). A tall tree, endemic and common in forest.

Dialium Wallichii, *Prain.* Rantau Panjang (Forest Dept.). A tree, endemic, Perak and Pahang to Singapore, in forest.

Bauhinia bidentata, *Jack.* Batu Caves; Rawang. A long climber of Sumatra; in the Peninsula Penang to Johore, common in forest.

Bauhinia calycina, *Ridl.* K. Lumpur; Petaling; Weld's Hill. A climbing shrub, ? endemic, not uncommon in the south in forest.

Bauhinia cornifolia, *Baker.* Petaling; Seminyih; Sungai Buloh. A liane, endemic, Penang and Kelantan to Negri Sembilan, in forest.

Bauhinia ferruginea, *Roxb.* Petaling (Ridley). A liane, endemic, Penang, Perak, Pahang, not common in forest.

Bauhinia flammifera, *Ridl.* Ampang; Bangi; K. Lumpur; Seminyih; Ulu Gombak; Weld's Hill. A big climber of Lower Siam; in the Peninsula common in forest from Penang and Upper Perak to Johore.

Bauhinia semibifida, *Roxb.* Sungai Buloh (Forest Dept.). A climbing shrub of Sumatra and Borneo; in the Peninsula not common in forest, Trengganu, Malacca, Singapore.

Bauhinia strychnoidea, *Prain.* Batu Caves (Kelsall). A climbing shrub, endemic, usually on limestone, Perak, Pahang and Negri Sembilan.

Cynometra inaequifolia, *A. Gray.* K. Lumpur (Forest Dept.). A tall tree of Lower Siam and the Philippines; in the Peninsula common in forest from Penang to Negri Sembilan.

Cynometra polyandra, *Roxb.* Weld's Hill (Forest Dept.). A tree of India; in the Peninsula not common in forest, Penang, Kelantan and Malacca.

Sindora coriacea, *Prain.* Bangi; Sungai Buloh. A tree, endemic, not very common in forest, Penang to Malacca.

Azelia palembanica, *Baker.* Dusun Tua; K. Lumpur; Sungai Buloh; Ulu Gombak. A tall tree of Sumatra; in the Peninsula common in forest.

Azelia ? retusa, *Kurz.* Ulu Gombak (Forest Dept.).

Saraca cauliflora, *Baker.* K. Lumpur; Sungai Buloh. A small tree, endemic, not common, Perak, Kelantan, Pahang, Dindings, Malacca.

Saraca declinata, *Miq.* Kajang; K. Lumpur; Rawang; Ulu Gombak. A small tree of Lower Siam and Java; in the Peninsula Upper Perak, Pahang, Taiping, Malacca, in forest.

Saraca ? Kunstleri, *Prain.* Public Gardens, K. Lumpur (Forest Dept.).

Saraca taipingensis, *Cantley.* Batu Caves; K. Lumpur; Ulu Gombak. A small tree, endemic, common in forest by streams from Taiping to Johore.

Saraca triandra, *Baker.* Bukit Lagong; Kanching; K. Lumpur; Seminyih; Sungai Buloh. A small tree or shrub of Lower Siam, Sumatra and Borneo; in the Peninsula common in forest from Kedah and Kelantan to Malacca.

Leucostegane latistipulata, *Prain.* K. Lumpur (Forest Dept.). A small tree, endemic and rare in forest, Dindings.

Crudia Curtisii, *Prain.* Kepong; K. Lumpur. A lofty tree, endemic, Penang to Malacca, in forest.

Mezoneuron sumatranum, *Wight & Arnott.* Weld's Hill (Forest Dept.). A prickly climbing shrub of Sumatra, Borneo and the Philippines; in the Peninsula Penang to Singapore, in open places.

Adenanthera bicolor, *Moon.* K. Lumpur; Sungai Buloh; Ulu Gombak. A tree of Ceylon; in the Peninsula Penang, Taiping, Malacca, Singapore, in forest.

Adenanthera pavonina, *Linn.* Sungai Buloh (Forest Dept.). A small tree of S. E. Asia; in the Peninsula often planted and doubtfully wild.

Entada Schefferi, *Ridl.* K. Lumpur (Forest Dept.). A large climbing shrub of Lower Siam and Java; in the Peninsula not uncommon on riverbanks.

Leucaena glauca, *Benth.* K. Lumpur (Forest Dept.). A pantropic shrub of South American origin; in the Peninsula in waste ground, introduced.

Mimosa pudica, *Linn.* (The sensitive plant). A pantropic undershrub of South American origin; in the Peninsula very common in waste ground.

Acacia pennata, *Wild.* Batu Caves; Seminyih. A long climbing shrub of Tropical Africa and Tropical Asia; in the Peninsula common in open country, especially in the North.

Pithecolobium angulatum, *Benth.* Rawang; Weld's Hill. A small tree of Indo-Malaya and the Philippines; in the Peninsula common in secondary growth.

Pithecolobium bulbalinum, *Benth.* Ulu Gombak; Weld's Hill. A small tree of Sumatra; in the Peninsula not common in forest, Penang, Malacca and Singapore.

Pithecolobium Clypearia, *Benth.* Batang Berjuntai; K. Lumpur; Sungai Buloh. A small tree of W. Malaysia and South China; in the Peninsula common in secondary growth and open places.

Pithecolobium confertum, *Benth.* Ampang; Kajang; Weld's Hill. A small tree of Sumatra; in the Peninsula not common in open country, Penang, Pahang, Malacca, Singapore.

Pithecolobium contortum, *Mart.* Klang Gates; K. Lumpur; Rantau Panjang; Ulu Gombak. A small tree, endemic, common in forest from Kedah to Singapore.

Pithecolobium ellipticum, *Hassk.* Sungai Buloh; Weld's Hill. A small tree of W. Malaysia to the Philippines; in the Peninsula common in secondary growth and open places, from Kedah to Singapore.

Pithecolobium Kunstleri, *Prain.* Weld's Hill (Forest Dept.). A small tree of Borneo; in the Peninsula not common in forest, Perak, Pahang, Johore.

Pithecolobium lobatum, *Benth.* Klang Gates; Weld's Hill. A tree of Tenasserim to Borneo; in the Peninsula common in waste ground and secondary growth from Penang to Singapore.

Pithecolobium microcarpum, *Benth.* K. Lumpur (Forest Dept.). A small tree of Sumatra and Borneo; in the Peninsula common from Penang to Singapore, especially in open country.

CULTIVATED LEGUMINOSÆ.

Acacia auriculiformis, *Cunn.* Public Gardens, K. Lumpur. A small tree of Australia; in the Peninsula occasionally cultivated.

Albizzia lebbek, *Benth.* Public Gardens, K. Lumpur (Forest Dept.). A tree, widely distributed in tropical and sub-tropical countries, and cultivated; in the Peninsula probably cultivated only.

Albizzia moluccana, *Miq.* K. Lumpur (and in other localities). A tall tree of Borneo and the Molucca; in the Peninsula cultivated.

Arachis hypogaea, *Linn.* (The Groundnut). K. Lumpur (Ridley). A native of tropical America, cultivated in Indo-Malaya and other warm countries.

Bauhinia monandra, *Kurz.* K. Lumpur, in the Public Gardens. A small tree of Burma; in the Peninsula occasionally cultivated.

Bauhinia variegata, *Linn.* K. Lumpur (Forest Dept.). A tree of India, Burma and China; in the Peninsula cultivated only.

Caesalpinia pulcherrima, *Sw.* Common in gardens. A large shrub of Trop. America, often cultivated in the Peninsula as it is in most tropical countries.

Cassia javanica, *Linn.* Planted in K. Lumpur. A spreading tree of W. Malaysia; in the Peninsula cultivated only.

Centrosema Plumierii, *Benth.* Cultivated as a cover crop. A twiner of S. American origin; in the Peninsula cultivated only.

Desmodium gyroides, *DC.* Serdang Experimental Plantation. A shrub of Trop. Asia to New Guinea; in the Peninsula not common, Penang and Perak.

Enterolobium Saman, *Prain.* The rain tree, planted as a shade tree, native of Guiana.

Erythrina indica, *Linn.* K. Lumpur, probably planted (Forest Dept.). A tree of India to Polynesia; in the Peninsula a seashore tree, and often planted inland.

Indigofera hirsuta, *Linn.* Serdang Experimental Plantation. A herb, pantropic on seashores, not very common in the Peninsula.

Mimosa invisa, *Mart.* (Giant Mimosa). Serdang Experimental Plantation. A shrub of Brazil, occasionally cultivated in the Peninsula.

Parkia Roxburghii, *G. Don.* Planted in K. Lumpur. A tall tree of Assam, cultivated in Indo-China and Malaya, not wild in the Peninsula.

Peltophorum ferrugineum, *Benth.* K. Lumpur (Forest Dept.). A spreading tree of Tenasserim to Australia and Indo-China; in the Peninsula common near the sea, often planted inland.

Phaseolus lunatus, *Linn.* (Haricot Bean). A native of America, often cultivated in the Peninsula.

Pithecolobium dulce, *Benth.* Pudu (Forest Dept.). A tree of America, occasionally cultivated in the Peninsula.

Poinciana regia, *Boj.* (Flame of the Forest). A tree of Madagascar; in the Peninsula cultivated as an ornamental and roadside tree.

Pterocarpus indicus, *Willd.* (Angsena). Cultivated as a roadside tree. A tall tree of Tenasserim to the Philippines; in the Peninsula often planted, and perhaps wild in Penang, Ulu Selangor and Malacca.

Tamarindus indica, *Linn.* (The Tamarind). Ampang (Forest Dept.). A tree, pantropic in cultivation, probably African in origin; in the Peninsula cultivated and escaping.

ROSACEÆ.

Coccomelia nitida, *Ridl.* K. Lumpur (Ridley). A small tree of Sumatra, Borneo and the Philippines; in the Peninsula common in open places from Setul to Singapore.

Pygeum Hookerianum, *King.* Klang Gates (var.); Sungai Buloh. A shrub or small tree, endemic and not uncommon in open places from Perak to Johore, the var. recorded also from Fraser Hill.

Pygeum lanceolatum, *Hook. fil.* K. Lumpur (var. *Maingayi*, *Ridl.*); Seminyih. A small tree, endemic, the species in Penang, Trengganu, Malacca, Johore, the var. in Penang, Upper Perak, Fraser Hill, Negri Sembilan and Malacca.

Pygeum parviflorum, *Teys. & Binn.* Bangi (Forest Dept.). A tree of Java and Borneo; in the Peninsula common in forest from Upper Perak to Singapore.

Pygeum polystachyum, *Hook. fil.* K. Lumpur; Ulu Gombak. A tree, endemic and common in forest.

Rubus angulosus, *Focke.* Ampang; Batu Tiga; K. Lumpur. A big shrub of Mergui; in the Peninsula common in open places and secondary growth from Penang and Kelantan to Singapore.

Rubus elongatus, *Smith.* Ulu Gombak (Hume, Burkill). A slender bramble of W. Malaysia; in the Peninsula rare, Taiping Hills.

Rubus rosaefolius, *Smith.* Ulu Gombak (Hume). A bramble of Africa, Indo-Australia, China and Japan; in the Peninsula common in clearings and secondary growth in the Main Range, usually at considerable altitudes, and in Penang and the Taiping Hills.

SAXIFRAGACEÆ.

Polyosma flavo-virens, *Ridl.* Sungai Buloh. A small tree, endemic, not very common in forest, Penang, Perak, and the Dindings.

Polyosma laete-virens, *Griff.* K. Lumpur; Sungai Buloh. A tree, endemic, Penang to Mt. Ophir.

HAMAMELIDACEÆ.

Rhodoleia Teysmanni, *Miq.* Klang Gates (all collectors). A shrub or small tree of Sumatra; in the Peninsula usually montane in open dry places, Kedah Peak to Mt. Ophir.

LEGNOTIDACEÆ.

Carallia euryoides, *Ridl.* Klang Gates, on quartzite rocks, (Ridley). A small tree, endemic and local.

Carallia integerrima, *DC.* K. Lumpur (Weld's Hill and the Public Gardens). A tree of Indo-Australia and China; in the Peninsula common in forest from Perlis to Singapore.

Carallia Scortechinii, *King.* Batu Caves; Petaling. A shrub or small tree, endemic, rare, Perak and Singapore.

Carallia suffruticosa, *Ridl.* *Carallia spinulosa*, *Ridl.* Dusun Tua; Seminyih; Weld's Hill. A shrub or small tree of Tonkin; in the Peninsula not common, Perak and Pahang.

Gynotroches axillaris, *Bl.* K. Lumpur; Rantau Panjang; Ulu Gombak. A small slender tree of W. Malaysia to the Philippines; in the Peninsula common in forest.

Pellacalyx axillaris, *Korth.* Public Gardens and Weld's Hill (Forest Dept.). A small tree of Sumatra and the Philippines; in the Peninsula common in open damp places from Penang to Singapore.

Pellacalyx Saccardianus, *Scort.* Batang Berjuntai; Kajang; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A small tree of Borneo; in the Peninsula common in open places and secondary growth; from Penang to Singapore.

ANISOPHYLLAEACEÆ.

Anisophyllaea apetala, *Scort.* Klang Gates; Petaling. A small tree, endemic, Taiping to Malacca, in forest.

Anisophyllaea Griffithii, *Oliv.* K. Lumpur; Rantau Panjang; Ulu Gombak. A tree, endemic, Penang, Malacca and Singapore, in forest.

COMBRETACEÆ.

Terminalia belerica, *Roxb.* K. Lumpur (Forest Dept.). A tall tree of Indo-Malaya; in the Peninsula not common in forest, Perak.

Terminalia bialata, *Steud.* Weld's Hill (Forest Dept.). A tall tree of Burma and Tenasserim; in the Peninsula rare in open country, Perlis and Langkawi.

Terminalia citrina, *Roxb.* Weld's Hill (Forest Dept.). A tree or climber of India; in the Peninsula Penang, Perak, Pahang, Negri Sembilan, in forest.

Combretum chinense, *Roxb.* Ampang (Forest Dept.). A climbing shrub of India to Tenasserim and China; in the Peninsula not common in open places, Penang and Perak.

Combretum nigrescens, *King.* Batu Caves; Sungai Buloh. A large climbing shrub, endemic, Perak, Pahang and Negri Sembilan, in forest.

Combretum sundaicum, *Miq.* Batu Caves; K. Lumpur; Petaling; Sungai Buloh. A large climbing shrub of W. Malaysia to the Philippines; in the Peninsula common in open places from Penang to Singapore.

CULTIVATED COMBRETACEÆ.

Quisqualis indica, *Linn.* Ampang; Seminyih. A climbing shrub of the Tropics of the old World; in the Peninsula cultivated, and wild in Perlis and Pahang.

Terminalia Catappa, *Linn.* K. Lumpur, planted (Forest Dept.). A tree of India to Polynesia; in the Peninsula common on sea coasts, and often planted inland.

MYRTACEÆ.

Baeckia frutescens, *Linn.* Klang Gates (all collectors). A shrub or small tree of W. Malaysia, China and Japan; in the Peninsula common on dry open mountain tops.

Melaleuca leucadendron, *Linn.* K. Lumpur (Forest Dept.). A tree of Indo-Australia and Indo-China; in the Peninsula common in wet places and often planted.

Rhodamnia cinerea, *Jack.* K. Lumpur; Ulu Gombak. A small tree of Siam to Australia; in the Peninsula common in secondary growth.

Rhodomyrtus tomentosa, *Wight.* K. Lumpur, and doubtless in other localities. A shrub of Indo-Malaya to the Philippines, China and Japan; in the Peninsula common in dry open places.

Decaspermum paniculatum, *Kurz.* K. Lumpur; Sungai Buloh. A small tree of Indo-Malaya; in the Peninsula common in secondary growth from Langkawi to Singapore.

Eugenia acuminatissima, *Kurz.* Sungai Buloh (Forest Dept.). A tall tree of Burma and Sumatra; in the Peninsula common in forest from Penang to Singapore.

Eugenia bracteolata, *Wight.* K. Lumpur (Forest Dept.). A small tree of Burma; in the Peninsula common in forest and secondary growth.

Eugenia caudata, *King*. Sungai Buloh (Forest Dept.). A small tree, endemic, usually montane or sub-montane in forest, Penang, Taiping, Selangor, Mt. Ophir, Johore.

Eugenia chlorantha, *Duthie*. Sungai Buloh; ? Ulu Gombak (Hume 8940); Weld's Hill. A tree of Sumatra and Borneo; in the Peninsula common, especially in the South.

Eugenia cymosa, *Lam.* K. Lumpur; Sungai Buloh. A small tree of Indo-Malaya; in the Peninsula common in open country from Langkawi to Singapore.

Eugenia Dyeriana, *King*. Sungai Buloh; Weld's Hill. A tree, endemic, not common in forest, Perak and the Dindings.

Eugenia filiformis, *Wall.* Kanching; K. Lumpur; Rantau Panjang; Sungai Buloh. A small tree, endemic and common in forest and secondary growth from Penang to Singapore.

Eugenia grandis, *Wight*. Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Burma and Siam; in the Peninsula common on seashores, and often planted as a roadside tree.

Eugenia Griffithii, *Duthie*. K. Lumpur (Forest Dept.). A tree, endemic, Perak to Singapore, in forest.

Eugenia Hemsleyana, *King*. Kanching (Forest Dept.). A small tree, endemic, not common in forest, ? Penang, Perak and Selangor.

Eugenia Klossii, *Ridl.* Rantau Panjang (Kloss, fide Ridley). A tree, endemic and local.

Eugenia lepidocarpa, *Wall.* K. Lumpur (Forest Dept.). A tree of Burma; in the Peninsula common in secondary growth from Perak to Singapore.

Eugenia lineata, *Duthie*. Kajang; Rantau Panjang; Weld's Hill. A tree of W. Malaysia; in the Peninsula very common in open country.

Eugenia microcalyx, *Duthie*. K. Lumpur (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Eugenia oblata, *Roxb.* K. Lumpur (Forest Dept.). A tree of Assam to Borneo; in the Peninsula common in forest.

Eugenia papillosa, *Duthie*. K. Lumpur; Sungai Buloh. A tall tree, endemic, Perak, Malacca and Singapore, in swampy forest.

Eugenia penangiana, *Duthie*. Klang Gates (Brooks). A slender tree, endemic, Penang, Taiping, Malacca, in forest.

Eugenia pendens, *Duthie*. Sungai Buloh (Forest Dept.). A small tree, endemic and common in forest in the South,

Eugenia pergamentacea, *King*. Weld's Hill (Forest Dept.). A small tree, endemic, not common, Penang, Gunong Tahan.

Eugenia polyantha, *Wight*. Rantau Panjang; Weld's Hill. A tree of Indo-Malaya; in the Peninsula common in forest from Kedah to Singapore.

Eugenia pseudo-formosa, *King*. Klang Gates; Ulu Gombak; Weld's Hill. A shrub or small tree of Sumatra; in the Peninsula Langkawi to Singapore in forest apparently more common in the North.

Eugenia pseudo-subtilis, *King*. Weld's Hill (Forest Dept.). A small tree of Lower Siam; in the Peninsula Perlis to Singapore, perhaps planted in some of the localities.

Eugenia pseudo-tetraptera, *King*. Sungai Buloh (Forest Dept.). A small shrub of the Carimon Islands; in the Peninsula not rare in forest but seldom flowering (Ridley).

Eugenia punctulata, *King*. K. Lumpur (Forest Dept.). A tree of Borneo; in the Peninsula Taiping to Singapore, not uncommon.

Eugenia pyrifolia, *Duthie*. Batu Tiga; Sungai Buloh; Weld's Hill. A tree of Lower Siam; in the Peninsula common in open places in the South.

Eugenia Ridleyi, *King*. Sungai Buloh (Forest Dept.). A tall tree, endemic, not uncommon in forest, Penang, Pahang, Negri Sembilan and Singapore.

Eugenia Scortechinii, *King*. Seminyih; Weld's Hill. A small tree of Lower Siam; in the Peninsula Kedah to Singapore, in swampy forest.

Eugenia simulans, *King*. Rantau Panjang; Rawang; Sungai Buloh. A tree, endemic, Penang to Singapore.

Eugenia subdecussata, *Duthie*. Ulu Gombak; Weld's Hill. A bush or tree, endemic, common from Kedah to Singapore in open places and secondary growth.

Eugenia urceolata, *King*. Rawang; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula common in open forest from Perak to Singapore.

Eugenia valdevenosa, *Duthie*. Weld's Hill (Forest Dept.). A tree, endemic, Penang to Johore, usually in forest in the mountains.

Eugenia variolosa, *King*. K. Lumpur; Sungai Buloh. A small tree, endemic, common from Taiping to Singapore in lowland forest.

Eugenia venulosa, *Wall*. K. Lumpur (Forest Dept.). A small tree of the Karimon Islands; in the Peninsula common in the open country in the South.

Eugenia zeylanica, *Wight*. Sungai Buloh; Ulu Gombak. A bushy tree of India, Lower Siam, Java and Borneo; in the Peninsula common in open country from Penang to Singapore.

Pseudo-eugenia singaporensis, *King*. Rantau Panjang; Sungai Buloh. A small tree, endemic and common in the South.

Barringtonia fusiformis, *King*. Batu Caves (Ridley). A small tree, endemic, Langkawi and Kelantan to Malacca, in bamboo forest.

Barringtonia macrostachya, *King*. Ulu Gombak; Weld's Hill. A shrub or small tree of Burma and Borneo; in the Peninsula Langkawi, Kedah, Taiping, Malacca, Negri Sembilan, Johore (Pulau Tinggi), Singapore, in forest.

Barringtonia ? pauciflora, *King*. Weld's Hill (Forest Dept.). A small tree, endemic and rare, hitherto only known from the Taiping Hills. The Weld's Hill specimen is in fruit only, and as fruit of *B. pauciflora* has not been described, its identity is doubtful.

Barringtonia racemosa, *Roxb.* K. Lumpur (Forest Dept.). A shrub or small tree of Indo-Malaya to Polynesia; in the Peninsula common near the sea and in open places.

Barringtonia Scortechinii, *King*. Sungai Buloh; Weld's Hill. A tree, endemic, Penang to Malacca, in forest.

Barringtonia sumatrana, *Miq.* Klang Gates (Forest Dept.). A large shrub of Sumatra, Borneo and Celebes; in the Peninsula Penang to Singapore usually near the sea.

CULTIVATED MYRTACEÆ.

Bertholletia excelsa, *H. & R.* (Brazil nut). Serdang and the Public Gardens, K. Lumpur. A tree of Brazil; in the Peninsula very occasionally cultivated.

Eugenia aquea, *Burm.* (Jambu Ayer). K. Lumpur (Agric. Dept.). A small tree, probably native of India, cultivated only in the Peninsula.

Eugenia caryophyllata, *Thunb.* (Cloves). Serdang Experimental Plantation. A tree of the Moluccas; in the Peninsula occasionally cultivated.

Eugenia malaccensis, *Linn.* (Jambu). K. Lumpur (Agric. Dept.). A tree of unknown origin, not known in a wild state.

Eugenia quadrangularis, *Duch.* Circular Rd. Plantation. (Forest Dept.). A native of S. America, cultivated in the Peninsula.

Eugenia uniflora, *Berg.* K. Lumpur (Agric. Dept.). A small tree of Brazil, now widely cultivated in the East.

Eugenia xanthocarpa, *Thw.* K. Lumpur (Forest Dept.). A tree of Ceylon; in the Peninsula occasionally cultivated.

Psidium guava, *Linn.* (The Guava). A small tree, pantropic, native of Trop. America; in the Peninsula commonly cultivated.

MELASTOMATACEÆ.

Melastoma imbricatum, *Wall.* Ulu Gombak (Ridley, Hume). A large shrub of Assam, Indo-China and Sumatra; in the Peninsula Penang, Taiping, the Dindings, and on the Main Range, in forest.

Melastoma malabathricum, *Linn.* Rantau Panjang; Ulu Gombak. A shrub of Indo-Australia and the Mascarene Islands; in the Peninsula common in open places in the North, K. Lumpur being its most southerly range.

Melastoma polyanthum, *Bl.* Klang Gates; K. Lumpur; Pudu (flowers white); Seminyih. A shrub of W. Malaysia to the Philippines; in the Peninsula very common in open places in the south.

Allomorpha exigua, *Bl.* Klang Gates; Rantau Panjang; Seminyih. A small shrub of Sumatra; in the Peninsula not very common in forest, Penang Hill.

var. *capillaris*, *Ridl.* Klang Gates; Ulu Gombak. Endemic, Upper Perak, Taiping, the Dindings and North Johore.

Allomorpha malaccensis, *Ridl.* Batu Caves; K. Lumpur; Rantau Panjang; Rawang; Sungai Buloh; Ulu Gombak. A shrub of Sumatra; in the Peninsula common in forest.

Blastus pulverulentus, *Ridl.* Ulu Langat (Kloss, fide Ridley). A shrub, endemic and local.

Ochthocharis decumbens, *King.* Sungai Buloh (Ridley). A slender shrub, endemic, not common in damp forest, Perak, Johore.

Anerincleistus pauciflora, *Ridl.* Klang Gates; Ulu Gombak. A shrub, endemic and rare in forest, Ginting Bidai (Selangor).

Phaulanthus Curtisii, *Ridl.* Seminyih (Hume). A small shrub, endemic, not common in forest, Penang, Upper Perak, Taiping, not hitherto recorded from further south than Sungei Siput.

Phaulanthus rudis, *Ridl.* Seminyih (Hume). A shrub, endemic, not common in forest, known also from Ginting Bidai and Ginting Peras on the Selangor-Pahang boundary.

Sonerila bicolor, *Stapf.* Sungai Buloh; Ulu Gombak. A herb, endemic, Perak and North Johore, in forest.

Sonerila heterostemon, *Naud.* Batang Berjuntai; Kanching; Klang Gates; K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A small herb of Sumatra and Borneo; in the Peninsula very common in open places in forest from Taiping to Singapore and in Trengganu and Pahang.

Sonerila integrifolia, *Stapf & King.* Batu Caves; Dusun Tua; Kanching; Klang Gates; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A herb, endemic, Taiping Hills and the Main Range in forest.

Sonerila nidularia, *Stapf.* Seminyih (Hume). A herb, endemic, usually in montane forest, Perak and Pahang.

Sonerila prostrata, *Ridl.* On the roadside at Klang Gates (Ridley, Burkill). A small slender creeping herb, endemic and known only from this locality.

Phyllagathis Griffithii, *King.* Batang Berjuntai; K. Lumpur; Kuang. A herb, endemic, common from Taiping to Johore in forest.

Phyllagathis hispida, *King.* Kanching on limestone (Ridley). A herb, endemic and common, but usually montane.

Phyllagathis rotundifolia, *Bl.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Sungai Buloh; Ulu Gombak. A herb of Sumatra; in the Peninsula common in forest from Kedah to Johore.

Marumia nemorosa, *Bl.* Batang Berjuntai; Dusun Tua (var. *verrucosa*); Klang Gates; Seminyih; Ulu Gombak. A slender climbing shrub of Tenasserim, Sumatra and Borneo; in the Peninsula common on the edges of woods from Kedah and Trengganu to Johore.

Dissochaeta anomala, *King.* Seminyih (Hume 8152). A slender climber, endemic, not common in forest, Kelantan, Perak.

Dissochaeta celebica, *Bl.* Batang Berjuntai; Klang Gates; K. Lumpur; Petaling. A slender climbing shrub of Borneo, Celebes and the Philippines; in the Peninsula common from Penang and Trengganu to Singapore, on forest edges.

Dissochaeta gracilis, *Bl.* Ampang; Batu Caves; Kanching; Klang Gates; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A slender climbing shrub of W. Malaysia; in the Peninsula common from Upper Perak and Kelantan to Singapore, on forest edges.

Dissochaeta hirsuta, *Hook. fil.* Ulu Gombak (Hume 9131, 9287). A climbing shrub of Borneo; in the Peninsula rare in open places, Johore.

Dissochaeta intermedia, *Bl.* Rawang; Sepang. A slender climbing shrub of Java; in the Peninsula Penang to Singapore, on forest edges.

Dissochaeta pallida, *Bl.* Batang Berjuntai; Batu Caves; Bukit Raja; Klang Gates; K. Lumpur. A climbing shrub of W. Malaysia; in the Peninsula common in forest more especially in the North.

Dissochaeta ? punctulata, *Hook. fil.* Rantau Panjang (Hume).

Anplectrum divaricatum, *Triana.* Batang Berjuntai; Dusun Tua; Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Ulu Gombak. A climber of W. Malaysia; in the Peninsula Penang to Malacca, on forest edges.

Anplectrum lepidosetum, *King.* K. Lumpur; Seminyih; Ulu Gombak. A slender twining shrub of Borneo; in the Peninsula Penang to Singapore, not common in forest.

Anplectrum pallens, *Bl. var. petiolare*, *Ridl.* Rantau Panjang; Ulu Gombak. A slender climber of Sumatra and Borneo; in the Peninsula the var. common in forest, the species recorded from Penang only.

Medinilla crassinervia, *Bl.* Ulu Gombak (Forest Dept.). An epiphytic shrub of Borneo to New Guinea; in the Peninsula in forest from Penang to Singapore.

Medinilla Hasseltii, *Bl.* Klang Gates; K. Lumpur; Petaling; Seminyih. An epiphytic shrub of W. Malaysia; in the Peninsula common in forest from Upper Perak to Singapore.

Pogonantha pulverulenta, *Bl.* Klang Gates; Ulu Gombak. A small shrub of W. Malaysia; in the Peninsula common on rocks and trees.

Pternandra coerulescens, *Jack.* Kajang; K. Lumpur; Rawang; Sungai Buloh; Ulu Gombak. A small tree of W. Malaysia except Java; in the Peninsula common in the lowlands on the West.

Pternandra echinata, *Jack.* Ampang; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A bushy tree of W. Malaysia; in the Peninsula very common, especially in secondary growth.

Pternandra galeata, *Ridl.* Batu Tiga (Ridley). A small tree of Borneo; in the Peninsula not common in forest, Perak and Johore.

Pternandra Jackiana, *Ridl.* Ulu Gombak (Hume). A small tree, endemic, not common, Penang, Malacca, Singapore.

Memecylon acuminatum, *Sm.* Ulu Gombak (Hume). A tree, endemic, common in forest from Penang to Singapore.

Memecylon campanulatum, *Clarke.* Rawang (Kloss, fide Ridley). A tree, endemic and rare in forest, Ginting Bidai (Selangor), and Malacca.

Memecylon cinereum, *King*. ? Sungai Buloh; Weld's Hill. A shrub, endemic, not common in forest, Perak.

Memecylon dichotomum, *Clarke*. Dusun Tua; Klang Gates (var. *eugeniiflorum*, *Ridl.*); Seminyih; Sungai Buloh (var. *eugeniiflorum*); Ulu Gombak. A shrub, endemic, Kedah to Malacca in forest, the var. in Upper Perak and on Fraser Hill.

Memecylon edule, *Bl.* Weld's Hill (Forest Dept.). A shrub or small tree of Indo-Malaya; in the Peninsula common in open places, often near the sea.

Memecylon garcinioides, *Bl.* Rawang (Ridley). A small tree of W. Malaysia; in the Peninsula common in forest from Pulau Adang to Singapore.

Memecylon heteropleurum, *Bl.* K. Lumpur; Seminyih; Ulu Gombak. A shrub or small tree of Sumatra and Borneo; in the Peninsula common in forest from Perak and Pahang to Singapore.

Memecylon lævigatum, *Bl.* Weld's Hill (Forest Dept.). A shrub or small tree of Burma to Borneo; in the Peninsula Taiping to Singapore, in forest.

Memecylon myrsinioides, *Bl.* K. Lumpur (Ridley, Forest Dept.). A shrub or small tree of W. Malaysia; in the Peninsula common from Langkawi to Singapore, in secondary growth and near the sea.

Memecylon oleaefolium, *Bl.* Sungai Buloh (Forest Dept.). A small tree of Lower Siam, Sumatra and Bangka; in the Peninsula not common in forest, Penang, Perak, Singapore.

Memecylon oligoneuron, *Bl.* Sungai Buloh; Ulu Gombak. A small tree of Java, Borneo and the Philippines; in the Peninsula not very common in forest, Penang, Perak, Pahang (Pulau Tioman), Malacca.

Memecylon pubescens, *King*. Sungai Buloh (Forest Dept. 8295). A small tree, endemic, apparently not common in forest, Perak, Malacca, Singapore.

LYTHRACEÆ.

Crypteronia Griffithii, *Clarke*. Sungai Buloh; Weld's Hill. A tree, endemic, Penang, Perak, Pahang, Malacca, in forest.

CULTIVATED LYTHRACEÆ.

Lagerstroemia flos-reginæ, *Retz.* (Pride of India). Common in gardens. A small tree of India and Java; in the Peninsula often cultivated, and wild on riverbanks in Kedah, Kelantan, Pahang and Negri Sembilan.

Lawsonia alba, *Lamk.* (Henna). Circular Rd. Plantation and Pudu (Forest Dept.). A small tree of Persia, cultivated in many tropical countries.

ONAGRACEÆ.

Jussiaea erecta, *Linn.* Ampang (Hume). A herb of Indo-Australia and China; in the Peninsula common in wet places.

Jussiaea repens, *Linn.* Ampang (Hume). An aquatic herb, pantropic; in the Peninsula common in ditches.

Jussiaea suffruticosa, *Linn.* Ampang; K. Lumpur; Pudu; Rantau Panjang; Seminyih; Serdang; Ulu Gombak. A herb, pantropic; in the Peninsula common in wet places.

Ludwigia prostrata, *Roxb.* Batu Tiga (Goodenough). A herb of Indo-Malaya and Japan; in the Peninsula common in ditches.

SAMYDACEÆ.

Casearia Clarkei, *King.* Weld's Hill (Forest Dept.). A small tree, endemic, not common in forest, Penang to Singapore.

Casearia esculenta, *Roxb.* Ulu Gombak; Weld's Hill. A shrub or small tree of India; in the Peninsula apparently common.

Osmelia Maingayi, *King.* Batu Caves; Klang Gates. A tree, endemic and common in forest from Upper Perak to Singapore.

Homalium frutescens, *King.* Klang Gates; K. Lumpur; Rantau Panjang. A small tree of W. Malaysia; in the Peninsula Langkawi, Perak, Pahang, Johore, in wet forest.

Homalium grandiflorum, *Benth.* Ulu Gombak; Weld's Hill. A tree of Tenasserim and Sumatra; in the Peninsula Perak and the Dindings to Singapore, in forest.

Homalium logifolium, *Benth.* Batu Caves; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree, endemic, Penang and Tomoh to N. Johore, in forest.

TURNERACEÆ, CULTIVATED.

Turnera ulmifolia, *Linn.* Cultivated, fide Foxworthy. A herb of South American origin, cultivated and run wild in the Peninsula.

PASSIFLORACEÆ.

Passiflora foetida, *Linn.* Common in and around K. Lumpur. A climbing herb, pantropic, of S. American origin; in the Peninsula common in open country and waste ground.

Adenia acuminata, *King*. Batang Berjuntai; Bukit Raja; Petaling; K. Lumpur. A slender climber of Sumatra and Java; in the Peninsula common on forest edges.

Adenia nicobarica, *King*. K. Lumpur (Ridley). A slender climber of the Andaman and Nicobar Islands, and Lower Siam; in the Peninsula Setul to Johore, in secondary growth.

Adenia populifolia, *Engl*. K. Lumpur; Petaling; Seminyih; Sungai Buloh; Ulu Gombak. A slender climber of Borneo and Timor; in the Peninsula common on forest edges from Taiping to Singapore.

Paropsia vareciformis, *Mast*. Ulu Gombak; Weld's Hill. A shrub or small tree, endemic, not common in forest, Perak and Malacca.

CULTIVATED PASSIFLORACEÆ.

Carica Papaya, *Linn*. (The Papaya). A native of S. America, cultivated in the Peninsula as it is in all tropical countries.

Passiflora quadrangularis, *Linn*. (The Granadilla). Cultivated, fide Foxworthy. A native of Trop. America, cultivated in all tropics.

CUCURBITACEÆ.

Trichosanthes celebica, *Cogn*. Circular Rd. Plantation (Forest Dept.). A climber of Celebes; in the Peninsula Taiping to Singapore.

Trichosanthes Wallichiana, *Wight*. Rantau Panjang (Kloss, fide Ridley). A climber of India; in the Peninsula common in forest from Penang to Singapore.

Hodgsonia capniocarpa, *Ridl*. Batu Caves; Batu Tiga. A climbing herb of India, Burma, Sumatra and Borneo; in the Peninsula Penang to Malacca, in open places.

Gymnopetalum quinquelobum, *Miq*. Ulu Gombak (Hume). A creeping herb of Indo-Malaya; in the Peninsula not common, Penang and Kelantan to Singapore.

Momordica charantia, *Linn*. Seminyih; Ulu Gombak (doubtless escapes from cultivation). A climber, pantropic; cultivated in the Peninsula.

Momordica cochinchinensis, *Spreng*. Batu Caves (Ridley). A climber of Indo-Malaya to New Guinea, and China; in the Peninsula on riverbanks in the North.

Melothria affinis, *King*. Batu Caves (Ridley). A climbing herb of Borneo; in the Peninsula Perak and Kelantan to Johore.

Melothria marginata, *Cogn*. Batu Caves (Ridley). A climbing herb of Sumatra and Java; in the Peninsula Langkawi to Malacca in waste ground.

Zanonia Clarkei, *King*. Batu Caves (Ridley). A climber, endemic and rare. Kinta (Perak).

CULTIVATED CUCURBITACEÆ.

Benincasa cerifera, *Sav.* (The Wax Gourd). Cultivated, fide Foxworthy. A large climbing herb of Africa, Indo-Australia, China and Japan, known only in cultivation.

Citrulus vulgaris, *Linn.* (The Water Melon). Cultivated, fide Foxworthy. A climbing herb, pantropic in cultivation.

Cucumis sativus, *Linn.* (The Cucumber). A climbing herb, cultivated in all tropics and in temperate regions.

Cucurbita maxima, *Duch.* (The Gourd). An annual climbing herb, cultivated in all tropics and in temperate regions.

Cucurbita Pepo, *DC.* (The Pumpkin). Cultivated, fide Foxworthy. A large climbing herb, cultivated in the tropics and in temperate countries.

Luffa ægyptica, *Mill.* (The Loofa). Cultivated, fide Foxworthy. Cultivated in all tropics, origin uncertain.

Lagenaria vulgaris, *Ser.* (The Bottle Gourd). Cultivated, fide Foxworthy. A large climbing herb, cultivated in all tropics.

BEGONIACEÆ.

Begonia clivalis, *Ridl.* Klang Gates (all collectors). A small herb, endemic and rare on sandy banks, Semangkok Pass.

Begonia Hasskarlii, *Zoll. & Mor.* Batu Caves (Ridley). A herb of Java; in the Peninsula not very common on limestone in Perak and Pahang.

Begonia isoptera, *Dry.* Klang Gates; Ulu Gombak. A herb of Sumatra and Java; in the Peninsula common in damp places in forest.

Begonia phoeniogramma, *Ridl.* Batu Caves (Ridley). A small herb, endemic and rare, on limestone, Langkawi.

Begonia rhoephila, *Ridl.* Ulu Gombak (Ridley). A creeping herb, endemic and local.

Begonia sinuata, *Wall.* Seminyih (Hume). A tuberous herb of Lower Siam; in the Peninsula not uncommon in forest in the North.

Begonia taipingensis, *King.* Kanching (Ridley). A creeping herb, endemic, Taipung Hills, Semangkok, in forest.

CACTACEÆ, CULTIVATED.

Opuntia monacantha, *Haw.* K. Lumpur, cultivated. A succulent shrub of S. E. Brazil, now established in the Peninsula in sandy places near the sea.

FICOIDEÆ.

Mollugo pentaphylla, *Linn.* K. Lumpur; Seminyih. A herb of Indo-Malaya, China and Polynesia; in the Peninsula common in waste ground.

UMBELLIFERÆ.

Hydrocotyle asiatica, *Linn.* K. Lumpur; Ulu Gombak. A creeping herb of the tropics and subtropics of the Old World; in the Peninsula common in grass.

Hydrocotyle javanica, *Thunb.* Ulu Gombak (Hume). A creeping herb of Indo-Australia, China and Japan; in the Peninsula usually montane in forest, Upper Perak to Selangor.

Eryngium foetidum, *Linn.* K. Lumpur; Ulu Gombak. A spiny herb of South American origin; in the Peninsula common in waste ground.

ARALIACEÆ.

Aralia ferox, *Miq.* Ulu Gombak (Hume). A scandent shrub of Java and Borneo; in the Peninsula usually in montane forest, Perak, Pahang, Semangkok Pass.

Aralia Thomsoni, *Seem.* Ulu Gombak (Hume). A prickly shrub of India; in the Peninsula not uncommon, usually in montane forest, Penang to Negri Sembilan.

Schefflera heterophylla, *Harms.* Weld's Hill (Forest Dept.). A shrub or small tree of Sumatra and Java; in the Peninsula Penang and Upper Perak to Malacca, in forest.

Schefflera subulata, *Viguier.* Batu Caves; Kajang; Klang Gates; Ulu Gombak; Weld's Hill. An epiphytic shrub of W. Malaysia; in the Peninsula common from Penang to Singapore.

Schefflera tomentosa, *Viguier.* Batu Tiga; K. Lumpur; Ulu Gombak. A shrub of Sumatra and Java; in the Peninsula Taiping to Johore, not common in forest.

Schefflera venulosa, *Harms.* K. Lumpur (Forest Dept.). An epiphytic shrub of Indo-Australia; in the Peninsula Langkawi to Singapore.

Trevesia cheirantha, *Ridl.* Ulu Gombak; Weld's Hill. A small prickly tree of Burma and Sumatra; in the Peninsula common in forest from Kedah and Kelantan to Singapore.

Arthrophyllum congestum, *Ridl.* Klang Gates (Ridley). A small tree, endemic and rare, Dindings,

Arthrophyllum ovalifolium, *Miq.* K. Lumpur (Forest Dept.). A small tree of the Andamans and Sumatra; in the Peninsula common in open places and secondary growth.

Brassiopsis elegans, *Ridl.* Ulu Langat (Kloss, fide Ridley). A shrub, endemic and local.

CORNACEÆ.

Alangium ebenaceum, *Griff.* Rantau Panjang; Sungai Buloh; Weld's Hill. A small tree, endemic, Penang to Johore, in forest.

Alangium nobile, *Harms.* Sungai Buloh (Forest Dept.). A tall tree, endemic, Penang to Singapore, in forest.

Alangium uniloculare, *King.* Sungai Buloh; Weld's Hill. A tree, endemic, common in forest from Perak to Singapore.

Aralidium pinnatifidum, *Miq.* Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A small tree of Sumatra and Borneo; in the Peninsula common in forest.

RUBIACEÆ.

Mitragyne speciosa, *Korth.* Klang Gates; Petaling. A tree of W. Malaysia to New Guinea; in the Peninsula not common in open places, Penang, Perak, Pahang.

Nauclea Junghuhnii, *Meir.* K. Lumpur; Seminyih. A bushy tree of Indo-China and W. Malaysia to the Philippines; in the Peninsula Penang to Singapore in lowland forest.

Nauclea Maingayi, *Hook. fil.* Bukit Raja; Kepong; K. Lumpur. A tall tree of Borneo; in the Peninsula Penang to Negri Sembilan, usually in open swampy places.

Nauclea subdita, *Merr.* Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A small tree of Sumatra to New Guinea; in the Peninsula common in forest and on riverbanks.

Neonauclea purpurascens, *Ridl.* Klang Gates; Rawang; Seminyih. A small tree of Sumatra to the Philippines; in the Peninsula not common in forest, Upper Perak to Singapore.

Adina polycephala, *Benth.* Weld's Hill (Forest Dept.). A tall tree of Burma; Indo-China, Sumatra and Java; in the Peninsula not common in forest, Penang and Malacca.

Adina rubescens, *Hemsl.* Rantau Panjang; Weld's Hill. A tree, endemic and common in forest.

Anthocephalus indicus, *Rich.* Ampang; K. Lumpur. A tall tree of Indo-Malaya; in the Peninsula rare, Perak.

Uncaria attenuata, *Korth.* Seminyih (Hume). A slender climber of Indo-Malaya; in the Peninsula common in forest.

Uncaria dasyoneura, *Korth.* Seminyih (Hume). A climber of Ceylon and Java; in the Peninsula not common, Penang to Malacca.

Uncaria Gambier, *Roxb.* Ulu Gombak (Hume). A slender climber, or (in cultivation) a bush, of W. Malaysia; in the Peninsula cultivated and escaping.

Uncaria glabrata, *DC.* Batu Tiga; Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A climbing shrub of W. Malaysia; in the Peninsula common in forest in the South.

Uncaria jasminiflora, *Hook. fil.* Petaling (Ridley). A climbing shrub of Borneo; in the Peninsula not common in forest, Perak and Singapore.

Uncaria ovalifolia, *Roxb.* K. Lumpur; Rantau Panjang; A slender climbing shrub of Burma and Borneo; in the Peninsula common in forest.

Uncaria pedicellata, *Roxb.* K. Lumpur; Rantau Panjang; Ulu Gombak. A climbing shrub of W. Malaysia; in the Peninsula common, usually in open places.

Uncaria pteropoda, *Miq.* K. Lumpur (Ridley). A liane of Sumatra to New Guinea; in the Peninsula common in secondary growth and forest edges.

Uncaria Roxburghiana, *Korth.* K. Lumpur (Ridley). A slender climber of Sumatra and Borneo; in the Peninsula Taiping to Singapore, on forest edges.

Uncaria sclerophylla, *Roxb.* K. Lumpur (Ridley). A big climbing shrub of W. Malaysia; in the Peninsula common in forest and secondary growth.

Uncaria trinervis, *Har.* Ulu Gombak (Hume). A slender climber, endemic and rare in forest, Penang Hill, Taiping Hill.

Coptosopelta flavescens, *Korth.* Ulu Gombak (Forest Dept.). A climbing shrub of Indo-Malaya; in the Peninsula common in forest.

Greenia Jackii, *Wight & Arn.* Batang Berjuntai; Klang Gates; Rantau Panjang; Ulu Gombak; Weld's Hill. A shrub or small tree, endemic and common in forest from Langkawi to Malacca.

Aleisanthia rupestris, *Ridl.* Klang Gates (all collectors). A small shrub, endemic and local in cracks of quartzite rocks.

Becheria parviflora, *Ridl.* Batu Tiga (Ridley). A small shrub of St. Barbe Isle; in the Peninsula not common in forest, Perak, Pahang.

Argostemma bicolor, *King.* Weld's Hill (Md. Nur 4791). A small herb, endemic and rare, Perak.

Argostemma denticulatum, *Ridl.* Klang Gates (Hume). An erect herb, endemic and rare. known also from Ginting Sempak, Selangor, at 3,990 feet, fide Ridley.

Argostemma Hookeri, *King.* Petaling (Ridley). A slender creeping herb, endemic, usually in montane forest, Kedah to Johore.

Argostemma inæquilaterum, *Benn.* Batu Caves (Ridl.). A herb, endemic, not common, usually on limestone, Penang, Perak and Malacca.

Argostemma oblongum, *King.* Seminyih (Hume). A small herb, endemic, Perak to Johore in forest.

Argostemma pictum, *Wall.* Klang Gates (Ridley). A small succulent herb of Tenasserim and Lingga; in the Peninsula common in forest.

Argostemma subcrassum, *King.* K. Lumpur; Seminyih. A succulent herb, endemic, usually in montane forest, Perak and Pahang.

Argostemma tenue, *Ridl.* Ulu Gombak (Ridley). A herb, endemic and rare in forest, Tampin Hill (Negri Sembilan).

Argostemma trichanthum, *Ridl.* Ulu Langat (Kloss, fide Ridley). A small herb, endemic and local.

Argostemma unifolioides, *King.* Ulu Gombak (Hume). A herb, endemic, not common in forest, Perak.

Argostemma unifolium, *Benn.* Seminyih (Hume). A herb, endemic and usually in montane forest, Kedah, Penang, Mt. Ophir, Johore.

Ophiorrhiza communis, *Ridl.* Klang Gates; Petaling; Rawang. A herb of Borneo; in the Peninsula common in forest.

Ophiorrhiza discolor, *R. Br.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A herb, endemic, Penang to Johore in forest.

Ophiorrhiza fruticosa, *Ridl.* Batu Caves (Ridley). A small shrublet, endemic and local.

Ophiorrhiza major, *Ridl.* Batu Caves; K. Lumpur; Seminyih; Ulu Gombak. A herb, endemic, common in forest as far south as Mt. Ophir.

Ophiorrhiza pallidula, *Ridl.* Batu Caves; Seminyih; Ulu Gombak. A herb, endemic, not common in forest, Perak, Pahang, Selangor.

Ophiorrhiza tenella, *King.* Ulu Gombak (Hume). A small herb, endemic and usually in montane forest, Kedah, Perak, Pahang, Selangor.

Ophiorrhiza tenuis, *Ridl.* Pusun Tua; Ulu Gombak (var. *minor*, *Ridl.*). A herb, endemic and rare in forest, Perak and the Semangkok Pass (Selangor).

Ophiorrhiza tomentosa, *Jack.* Ulu Gombak (Hume). A herb of Siam and Sumatra; in the Peninsula Langkawi to Mt. Ophir in forest.

Hedyotis auricularia, *Linn.* Batang Berjuntai; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A herb of Indo-Australia; in the Peninsula common in open places.

Hedyotis capitellata, *Wall.* Klang Gates; Rawang; Ulu Gombak. A scandent herb of Tenasserim to W. Malaysia; in the Peninsula common in open places and forest edges.

Hedyotis congesta, *Wall.* Batang Berjuntai; Rantau Panjang; Seminyih; Ulu Gombak. A shrubby herb of Tenasserim, Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Hedyotis macrophylla, *Wall.* Ulu Gombak (Hume). A woody herb of Tenasserim; in the Peninsula widely spread in forest, but not common.

Hedyotis mollis, *Wall.* Ulu Gombak (Hume). A scandent herb, endemic, Penang and Kelantan to Negri Sembilan in forest.

Hedyotis vestita, *R. Br.* Klang Gates; Ulu Gombak. A herb of Indo-Malaya to the Philippines; in the Peninsula common in open and waste ground.

Oldenlandia corymbosa, *Linn.* Klang Gates; K. Lumpur. A pantropic herb, common in the Peninsula in open sandy places.

Oldenlandia dichotoma, *Hook. fil.* K. Lumpur; Salak; Seminyih; Ulu Gombak. A herb of India; in the Peninsula common in dry shady places.

Oldenlandia diffusa, *Roxb.* Batang Berjuntai; Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak. A diffuse herb of Trop. Asia and Japan; in the Peninsula common in dry open places.

Oldenlandia trinervia, *Retz.* Ulu Gombak (Hume). A prostrate herb of Trop. Africa and Indo-Malaya; in the Peninsula in open sandy places, Penang, Pahang River, Singapore.

Lucinaea membranacea, *King.* Seminyih; Sungai Buloh. An epiphytic climber of Borneo; in the Peninsula Taiping to Singapore in forest.

Lucinaea morinda, *DC.* K. Lumpur (Ridley). A climbing bush of W. Malaysia; in the Peninsula Taiping to Singapore usually near the sea.

Lecananthus erubescens, *Jack.* K. Lumpur; Petaling. An epiphytic shrub of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Mussaenda glabra, *Vahl.* Batang Berjuntai; K. Lumpur. A bush or climber of Indo-Malaya and China; in the Peninsula common in secondary growth.

Mussaenda mutabilis, *Hook. fil.* K. Lumpur; Rawang; Seminyih; Ulu Gombak. A sarmentose bush, endemic, common in forest from Kelantan and Perak to Singapore.

Mussaenda polyneura, *King.* Ulu Gombak (Hume). A climbing shrub of Tenasserim; in the Peninsula not common in forest, Perak and Singapore.

Mussaenda villosa, *Wall.* Dusun Tua; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A shrub of Siam and Borneo; in the Peninsula common in forest in the north.

Mussaenda Wrayi, *King.* Ulu Gombak (Ridley). A scandent shrub, endemic, Penang to Selangor, in forest.

Adenosacme malayana, *Wall.* Batu Caves; Ulu Gombak. A small shrub, endemic and common in forest over the whole Peninsula.

Mycetia Scortechinii, *Ridl.* Ulu Gombak (Hume). A shrub, endemic in forest, Perak, and Bukit Hitam and Ginting Sempak, Selangor.

Aulocodiscus premnoides, *Hook. fil.* Batu Caves; K. Lumpur; Rawang; Sungai Buloh. A small tree of Tenasserim; in the Peninsula common in forest.

Urophyllum Curtisii, *King, MS.* K. Lumpur (Curtis 2348). There is only one sheet of this in Herb. Singapore, and apparently it has never been described.

Urophyllum glabrum, *Wall.* Ampang; Dusun Tua; Kanching; Petaling; Rantau Panjang; Sungai Buloh; Ulu Gombak; Weld's Hill. A shrub of W. Malaysia to the Philippines; in the Peninsula common in lowland forest.

Urophyllum Griffithianum, *Hook. fil.* Bukit Cheraka; Rawang. A shrub or small tree of Sumatra and Java; in the Peninsula common in forest from Langkawi to Singapore.

Urophyllum hirsutum, *Hook. fil.* Klang Gates; Ulu Gombak; Weld's Hill. A shrub or small tree, endemic, common in forest from Penang to Singapore.

Urophyllum macrophyllum, *Korth.* Dusun Tua; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrub or small tree of Tenasserim, Java and Borneo; in the Peninsula Penang to Singapore, in forest.

Urophyllum streptopodium, *Wall.* K. Lumpur; Seminyih; Ulu Gombak. A slender shrub of Borneo; in the Peninsula common in forest.

Urophyllum trifurcum, *Pears.* Ulu Gombak (Hume). A shrub or tree, endemic, Perak to Singapore, in forest.

Urophyllum umbellulatum, *Miq.* Dusun Tua (Ridley). A shrub of Sumatra; in the Peninsula not common, montane in Penang and Negri Sembilan.

Urophyllum villosum, *Wall.* Ulu Gombak (Hume). A small shrub, endemic, Penang to Singapore, in forest.

Randia anisophylla, *Jack.* K. Lumpur; Seminyih. A small tree of Sumatra and Borneo; in the Peninsula common in lowland forest.

Randia densiflora, *Benth.* Batu Caves; K. Lumpur; Sungai Buloh; Ulu Gombak. A shrub or tree of Indo-Australia, China, and Japan; in the Peninsula common in forest from Langkawi to Singapore.

Randia ? exaltata, *Griff.* Seminyih (Hume).

Randia impressinervia, *King and Gamble.* Rantau Panjang (Hume). A semi-parasitic shrub of Borneo; in the Peninsula not common in forest, Perak.

Randia macrophylla, *Hook. fil.* K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A small shrub of Sumatra; in the Peninsula common in forest.

Randia penangiana, *King and Gamble.* K. Lumpur (Ridley). A woody climber, endemic, Langkawi to Singapore, in forest.

Randia Scortechinii, *King and Gamble.* Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh; Ulu Gombak. A tree of Borneo; in the Peninsula common in forest from Penang to Negri Sembilan.

Gardenia elata, *Ridl.* Sungai Buloh (Forest Dept.). A lofty tree of Borneo; in the Peninsula rare in forest, Perak and Singapore.

Gardenia tentaculata, *Hook. fil.* Pudu (Ridley). A small bush of Borneo; in the Peninsula common, especially on riverbanks.

Gardenia tubifera, *Wall.* Sungai Buloh (Forest Dept.). A bush of Siam and W. Malaysia; in the Peninsula Selangor to Singapore, on muddy riverbanks.

Petunga floribunda, *Ridl.* K. Lumpur (Ridley). A bush or tree, endemic, Perak, Pahang, Johore, in marshy forest.

Petunga Roxburghii, *DC.* K. Lumpur (Ridley). A bush or small tree of India to Borneo and the Philippines; in the Peninsula common in wet places.

Diplospora malaccensis, *Hook. fil.* Seminyih; Sungai Buloh; Ulu Gombak. A small tree of Sumatra and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Diplospora ? Wrayi, *King and Gumble*. Ulu Gombak (Hume).

Jackia ornata, *Wall.* Sungai Buloh (Forest Dept.). A small tree of Sumatra and Borneo; in the Peninsula Taiping to Singapore in marshy places.

Ixora arguta, *Br.* Batu Caves (Ridley). A bush of Burma and Siam; in the Peninsula common in forest from Perlis to Johore.

Ixora concinna, *Br.* Seminyih; Ulu Gombak. A tall tree of St. Barbe Isle and Borneo; in the Peninsula Taiping to Singapore in forest.

Ixora congesta, *Roxb.* Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Seminyih; Ulu Gombak. A shrub of Tenasserim; in the Peninsula common in forest.

Ixora diversifolia, *Wall.* Batu Caves (Ridley). A shrub or small tree of Burma; in the Peninsula not common in forest, Perak and Pahang.

Ixora humilis, *King and Gumble*. Batu Caves; Dusun Tua; Seminyih; Ulu Gombak. A small shrub, endemic, not uncommon in forest in the north.

Ixora Kingstoni, *Hook. fil.* Batu Caves; K. Lumpur; Ulu Gombak. A large bush, endemic, Taiping to Johore in forest.

Ixora Lobbii, *Loud.* Klang Gates; K. Lumpur; Rawang; Sungai Buloh; Ulu Gombak. A shrub of Siam; in the Peninsula common in forest, Penang to Singapore.

Ixora pendula, *Jack.* Batu Caves; Dusun Tua; Seminyih; Ulu Gombak; Weld's Hill. A shrub of Sumatra; in the Peninsula common in forest.

Ixora stricta, *Roxb.* Bukit Raja; Klang Gates; Rantau Panjang. A shrub of Indo-China, China, Tenasserim, Java and Borneo; in the Peninsula common on riverbanks and in open places from Setul to Singapore.

Pavetta graciliflora, *Wall.* Klang Gates; Rawang; Sungai Buloh. A shrub of Lower Siam; in the Peninsula common in forest as far south as Malacca.

Pavetta indica, *Linn.* var. *canescens*, *Ridl.* Dusun Tua; Ulu Gombak; Weld's Hill. A bush of Indo-Australia and S. China; in the Peninsula the var. common, the species in Perlis.

Pavetta pauciflora, *Ridl.* Batu Caves (Ridley). A small tree, endemic and local.

Tarenna Curtisii, *Ridl.* Batu Caves, a var. with very small leaves (Ridley). A small shrub of Lower Siam; in the Peninsula rare, Langkawi on limestone.

Tarenna longifolia, *Ridl.* Ulu Gombak (Forest Dept.). A small shrub, endemic, Setul to North Johore, in forest.

Tarenna Napierii, *Ridl.* Seminyih; Ulu Gombak. A shrub, endemic, Perak, Pahang, Negri Sembilan, Johore, in forest.

Tarenna rudis, *Ridl.* Weld's Hill (Forest Dept. 2592, 2593). A shrub, endemic and local.

Tarenna stellulata, *Ridl.* Batu Caves; K. Lumpur. A shrub, endemic, common from Langkawi to Singapore.

Stylocoryna costata, *Miq.* K. Lumpur (Curtis, Forest Dept.). A tall tree of Sumatra; in the Peninsula Perak, Negri Sembilan and Malacca, in secondary growth.

Stylocoryna fragrans, *Bl.* Klang Gates; Weld's Hill. A large bush of W. Malaysia; in the Peninsula common in secondary growth.

Stylocoryna Maingayi, *King.* Ulu Gombak (Hume). A shrub, endemic, Taiping to Johore, usually in montane forest.

Stylocoryna mollis, *Wall.* Kanching; Sungai Buloh; Ulu Gombak. A small tree of Sumatra; in the Peninsula Penang to Singapore in forest.

Coffea malayana, *Ridl.* K. Lumpur (Ridley). A shrub, endemic, Selangor, Negri Sembilan and Johore in forest.

Coffea viridiflora, *Ridl.* Batu Caves (Ridley). A shrub, endemic and rare, known also from Waterloo, Perak.

Gardeniopsis longifolia, *Miq.* Seminyih; Ulu Gombak. A shrub of Sumatra; in the Peninsula common in forest from Langkawi to Singapore.

Timonius peduncularis, *Ridl.* K. Lumpur (Forest Dept., Ridley). A small tree of Indo-Malaya; in the Peninsula common in open country.

Timonius Wallichianus, *Valeton.* Klang Gates; Rantau Panjang; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree, endemic, common in open country from Langkawi to Singapore.

Morinda citrifolia, *Linn.* K. Lumpur (Forest Dept.). Probably from a cultivated plant. A small tree of Indo-Malaya; in the Peninsula perhaps not wild.

Morinda elliptica, *Ridl.* K. Lumpur (Curtis, Forest Dept.). A small tree, endemic and very common over the whole Peninsula in open places and near the sea.

Morinda umbellata, *Linn.* Ulu Gombak (Forest Dept.). A sarmentose shrub of Indo-Australia, China and Japan; in the Peninsula common in open places.

Rennellia speciosa, *Hook. fl.* Seminyih; Sungai Buloh; Ulu Gombak; Weld's Hill. A small shrub of Burma, Sumatra and Borneo; in the Peninsula common in forest from Kedah and Kelantan to Johore.

Gynochodes sublanceolata, *Miq.* K. Lumpur (Curtis). One sheet without flowers, doubtful). A slender woody climber of Sumatra and Borneo; in the Peninsula common in open country.

Canthium confertum, *Korth.* Ulu Gombak; Weld's Hill. A small tree of Bangka and Borneo; in the Peninsula common, but usually near the sea and on tidal rivers.

Canthium didymum, *Gaertn. fl.* K. Lumpur; Sungai Buloh; Ulu Gombak. A bush or small tree of Indo-Malaya and S. China; in the Peninsula common in forest and secondary growth.

Canthium glabrum, *Bl.* Weld's Hill (Forest Dept.). A small tree of Tenasserim, Siam and Java; in the Peninsula common in forest.

Canthium horridum, *Bl.* Klang Gates; Weld's Hill. A spiny shrub of Burma, Java; Borneo and the Philippines; in the Peninsula common in open country from Setul to Singapore.

Psychotria angulata, *Korth.* Batu Caves (Ridley). A shrub of Burma, Bangka and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Psychotria calocarpa, *Kurz.* Batu Caves; Ulu Gombak. A small shrub of India and Burma; in the Peninsula not common in forest, Kelantan, Perak, the Dindings, Malacca and Johore.

Psychotria Cantleyi, *Ridl.* Batu Caves (Burkill). A scandent shrub, endemic, Perak and Pahang to Singapore, in forest.

Psychotria lanceolaria, *Ridl.* Batu Caves (Ridley). A shrub, endemic and local.

Psychotria montana, *Bl.* K. Lumpur; Ulu Gombak. A shrub of Burma, Sumatra and Java; in the Peninsula not very common in forest, Upper Perak and Kelantan to Mt. Ophir.

Psychotria Maingayi, *Hook. fl.* Klang Gates; Ulu Gombak. A slender climber, endemic, Selangor to Singapore, often near the sea.

Psychotria penangensis, *Hook. fl.* Batang Berjuntai (Ridley). A shrubby climber, endemic, common in forest from Penang to Singapore.

Psychotria Ridleyi, *King and Gamble.* Ulu Gombak (Hume). A climber, endemic, not uncommon in forest in the south.

Psychotria rostrata, *Bl.* Dusun Tua; K. Lumpur; Rantau Panjang; Seminyih; Sungai Buloh; Ulu Gombak. A shrub of W. Malaysia; in the Peninsula common in forest from Perak and Kelantan to Singapore.

Psychotria sarmentosa, *Bl.* Rantau Panjang; Ulu Gombak. A climber of Indo-Malaya; in the Peninsula common in forest from Langkawi to Singapore.

Psychotria stipulacea, *Wall.* Ulu Gombak; Weld's Hill. A shrub of Sumatra; in the Peninsula common in forest from Kedah to Singapore.

Psychotria viridiflora, *Reinw.* Batu Caves; K. Lumpur; Petaling; Weld's Hill. A bush or small tree of Indo-Malaya; in the Peninsula common as far south as Malacca, in open places and forest.

Chasalia curviflora, *Thw.* Ampang; Batang Berjuntai; Batu Caves; Klang Gates; Rantau Panjang; Rawang; Seminyih; Sungai Buloh; Ulu Gombak; Weld's Hill. A shrub of Indo-Malaya to the Philippines; in the Peninsula very common in forest.

Chasalia pubescens, *Ridl.* Sungai Buloh; Ulu Gombak. A bush, endemic, not common in forest, Pahang, Negri Sembilan, Johore, Singapore.

Cephaelis cuneata, *Hook. fil.* Ulu Gombak (Hume). A small shrub, endemic and common from Taiping to Singapore.

Cephaelis Griffithii, *Hook. fil.* Seminyih; Ulu Gombak. A small shrub of Sumatra; in the Peninsula not uncommon in forest in the south.

Cephaelis triceps, *Ridl.* K. Lumpur (Ridley). A shrub, endemic and rare, known also from Fraser Hill and Cameron's Highlands.

Geophila reniformis, *Don.* Batu Caves; Seminyih. A creeping herb of Trop. America, Trop. Africa, Indo-Malaya to Polynesia and China; in the Peninsula common in forest from Langkawi to Singapore.

Lasianthus appressus, *Hook. fil.* Batu Tiga; Batang Berjuntai. A shrub of Borneo; in the Peninsula Langkawi to Singapore, usually in montane forest.

Lasianthus bractescens, *Ridl.* Batu Caves; Ulu Gombak. A shrub, endemic and rare in forest, Upper Perak and Perak.

Lasianthus constrictus, *Wight.* Sungai Buloh (Ridley). A shrub of Burma, Java and Borneo; in the Peninsula common in forest from Upper Perak and Kelantan to Singapore.

Lasianthus densifolius, *Miq.* Klang Gates; Seminyih; Ulu Gombak. A shrub of Borneo; in the Peninsula common in forest in the south.

Lasianthus ellipticus, *Wight*. Sungai Buloh; Ulu Gombak. A shrub, endemic, Upper Perak to Singapore, in forest.

Lasianthus Griffithii, *Wight*. Batu Caves; Petaling. A shrub of Lingga and Borneo; in the Peninsula Taiping to Singapore in forest on both coasts.

Lasianthus longifolius, *Wight*. K. Lumpur; Ulu Gombak. A shrub of Sumatra; in the Peninsula Dindings to Johore, in forest.

Lasianthus Lowianus, *King and Gamble*. Dusun Tua; Petaling; Seminyih. A shrub, endemic, often in montane forest, Kedah to Selangor.

Lasianthus Maingayi, *Hook. fil.* Dusun Tua; Klang Gates; Seminyih; Ulu Gombak. A shrub of Sumatra and Borneo; in the Peninsula common in forest from Upper Perak and Kelantan to Singapore.

Lasianthus montanus, *King and Gamble*. Ulu Gombak (Hume). A bush, endemic, usually in montane forest, Taiping Hills, Gunong Bubu, Gunong Tahan.

Lasianthus oblongus, *King and Gamble*. Klang Gates; Rawang; Sungai Buloh; Ulu Gombak; Weld's Hill. A large shrub, endemic, common from Kedah to Johore in forest.

Lasianthus pilosus, *Wight*. Batu Caves (Ridley). A shrub, endemic, Upper Perak and Kelantan to Johore, in forest.

Lasianthus Ridleyi, *King and Gamble*. K. Lumpur (Ridley). A small shrub, endemic, K. Lumpur to Singapore, in forest.

Lasianthus stipularis, *Bl.* Batu Caves; Kanching, on limestone (var. *hirtus*, *Ridl.*); Seminyih; Ulu Gombak. A slender shrub of Tenasserim to the Philippines; in the Peninsula common in forest, Upper Perak and Kelantan to Singapore.

Saprosma glomerulatum, *King and Gamble*. Kanching (Forest Dept.). A foetid shrub, endemic, Penang to Singapore, in forest.

Saprosma ternatum, *Hook. fil.* Batu Caves (Ridley). A shrub of India, Burma, Tenasserim and Java; in the Peninsula Perak and Kelantan to Mt. Ophir, in forest.

Paederia verticillata, *Bl.* Rawang (Ridley). A climbing shrub of Java, Borneo and the Philippines; in the Peninsula common from Kedah to Singapore in open places and secondary growth.

Borreria hispida, *Schum.* Circular Rd. Plantation; K. Lumpur; Salak South Rd. A rough wiry herb of Indo-Malaya to the Philippines and China; in the Peninsula common in waste ground.

Borreria laevicaulis, *Ridl.* Ampang; Klang Gates; K. Lumpur; Pudu; Ulu Gombak. A slender herb of India and Java; in the Peninsula common in waste ground.

Borreria latifolia, *Schum.* K. Lumpur (Hume). A fleshy herb, recently introduced from W. Indies and S. America, and not yet common in the Peninsula.

Borreria pilulifera, *Ridl.* Roadsides at Klang Gates (Ridley). A slender herb, endemic and local.

Borreria setidens, *Ridl.* K. Lumpur; Ulu Gombak. A herb of Java; in the Peninsula common in waste ground.

Spermacoce ocymoides, *Burm.* Batang Berjuntai; Rantau Panjang; Ulu Gombak. A pantropic herb, common in the Peninsula on roadsides and waste ground.

CULTIVATED RUBIACEÆ.

Coffea arabica, *Linn.* (Coffee). A small tree, pantropic in cultivation, native of S. W. Asia.

Gardenia florida, *Linn.* Common in gardens. A shrub of China and Japan; in the Peninsula commonly cultivated.

Ixora coccinea, *Linn.* Cultivated in K. Lumpur, fide Foxworthy. A bush, widely cultivated in Indo-Malaya.

Ixora macrothyrsa, *Teys. & Binn.* Common in gardens. A bush of Sumatra; in the Peninsula commonly cultivated.

Mussaenda erythrophylla, *Sch.* Public Gardens, K. Lumpur. A shrub of Trop. Africa; in the Peninsula occasionally cultivated.

Psychotria Ipecacuanha, *Stokes.* Serdang Experimental Plantation. A shrub of Brazil.

COMPOSITÆ.

Sparganophorus Vaillantii, *DC.* Klang Gates; K. Lumpur; Ulu Gombak. A herb of Trop. Africa, Asia and S. America; in the Peninsula in wet places in Kelantan and Singapore.

Elephantopus scaber, *Linn.* K. Lumpur, and doubtless in other localities. A herb, pantropic, very common in grass over the whole Peninsula.

Ageratum conyzoides, *Linn.* Ampang; Batang Berjuntai; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A herb, pantropic, of South American origin; in the Peninsula very common everywhere in waste ground.

Adenostemma viscosum, *Forst.* Batu Caves; Ulu Gombak. A cosmopolitan herb, common in the Peninsula, usually in waste ground.

Bidens pilosa, *Linn.* Batu Caves; Seminyih; Ulu Gombak. A herb, pantropic; in the Peninsula common in open places.

Synedrella nodiflora, Gaertn. Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula very common in waste ground.

Eclipta alba, Hassk. Ampang; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula a common weed in waste ground.

Vernonia chinensis, Less. Ulu Gombak (Hume). A herb of W. Malaysia to the Philippines; in the Peninsula common in open and waste ground.

Vernonia cinerea, Less. Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Pudu; Ulu Gombak. A herb, pantropic; common over the whole Peninsula in waste ground.

Vernonia javanica, DC. K. Lumpur. A small tree of Java and Borneo; in the Peninsula common in open country.

Vernonia Wallichii, Ridl. Klang Gates; K. Lumpur; Ulu Gombak. A tree of Svlhet, Lower Siam and Borneo; in the Peninsula common in forest from Penang to Singapore.

Gynura malasica, Ridl. K. Lumpur (Ridley). A herb of Borneo; in the Peninsula common in waste ground.

Gynura sarmentosa, DC. Seminyih (Hume). A scandent or erect herb of S. E. Asia; in the Peninsula common in forest and open places.

Emilia sonchifolia, DC. Klang Gates; Seminyih; Ulu Gombak. A pantropic herb, common over the whole Peninsula in waste ground.

Erechthites valerianifolia, DC. Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula common in waste places.

Blumea balsamifera, DC. (Ngai Camphor). Klang Gates; Pudu; K. Lumpur. An aromatic shrub of Indo-Malaya; in the Peninsula common in open places.

Blumea chinensis, DC. Klang Gates; K. Lumpur; Rawang. A scandent herb of Indo-Malaya to the Philippines and S. China; in the Peninsula common from Penang to Singapore.

Blumea lacera, DC. K. Lumpur; Seminyih; Ulu Gombak. A herb of Trop. Africa and Asia; in the Peninsula common on roadsides.

Blumea membranacea, DC. K. Lumpur (Ridley). A herb of Indo-Malaya; in the Peninsula common in open places, especially in the north.

Blumea myriocephala, DC. K. Lumpur (Curtis). A shrubby herb of Indo-Malaya; in the Peninsula not very common in forest, Perak to Negri Sembilan.

Erigeron sumatrense, *Retz.* Batu Caves; Seminyih. A herb of Siam, Sumatra, Java and the Philippines; in the Peninsula common in waste ground.

Crepis japonica, *Benth.* Seminyih (Hume). A herb of the Tropics of the Old World; in the Peninsula not uncommon in clearings in the hills.

CULTIVATED COMPOSITÆ.

Cosmos bipinnatus, *Cav.* Common in gardens. A native of America.

Lactuca brevirostris, *Champ.* Seminyih (Hume). No doubt an escape from a vegetable garden. It is cultivated occasionally in the Peninsula.

LOBELIACEÆ.

Lobelia affinis, *Wall.* Batu Caves; Dusun Tua; Klang Gates. A creeping herb of Indo-Malaya and China; in the Peninsula common in damp places from Penang to Singapore.

CAMPANULACEÆ.

Pentaphragma Scortechinii, *King & Gamble.* Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A succulent herb, endemic, common in damp places in forest from Upper Perak to Singapore.

VACCINIACEÆ.

Vaccinium bancanum, *Miq.* Kanching; Klang Gates. A terrestrial or epiphytic shrub of Java, Bangka and Borneo; in the Peninsula in montane forest on the Taiping Hills, Gunong Tahan, Fraser Hill, and Mt. Ophir.

Vaccinium eburneum, *Ridl.* Klang Gates (Ridley). A small tree, endemic, rare in dry open spots, Kedah Peak.

Vaccinium Hasseltii, *Miq.* Kanching; Ulu Gombak. A large epiphytic shrub of Sumatra, Java and Bangka; in the Peninsula Kedah Peak to Singapore, usually in forest.

ERICACEÆ.

Rhododendron longiflorum, *Lindl.* Kanching; Klang Gates. A shrub, epiphytic or on rocks, of Sumatra and Borneo; in the Peninsula Kedah Peak to Singapore, usually in forest.

Rhododendron orion, *Ridl.*, var. *auranticum*, *Ridl.* Klang Gates (Brooks). A small shrub, endemic and rare, the species from Menuang Gasing, Selangor, the var. known only from Klang Gates.

PLUMBAGINACEÆ, CULTIVATED.

Plumbago rosea, *Linn.* Cultivated and occasionally escaping. Origin unknown.

PLANTAGINACEÆ.

Plantago asiatica, *Linn.* Petaling (Ridley). A herb of Europe and Asia; in the Peninsula a sporadic weed in waste ground.

MYRSINACEÆ.

Maesa indica, *Wall.* Ulu Gombak (Hume). A shrub or small tree of Indo-Malaya; in the Peninsula not common, often montane, Taiping Hills, Kuala Kangsar, Fraser Hill.

Maesa ramentacea, *Miq.* Batang Berjuntai; Kanching; Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A sarmentose shrub of Indo-Malaya; in the Peninsula common in secondary growth from Langkawi and Kelantan to Singapore.

Myrsine Porteriana, *Wall.* Batu Caves (Ridley). A shrub or small tree of Sumatra; in the Peninsula common in forest from Penang to Johore.

Embelia amentacea, *Clarke.* Bukit Raja; Klang Gates; K. Lumpur; Rantau Panjang; Sungai Buloh. A slender climbing shrub of Borneo; in the Peninsula common in secondary growth from Taiping to Singapore.

Embelia coriacea, *Wall.* Klang Gates (Ridley). A liane of W. Malaysia to the Philippines; in the Peninsula common in forest.

Embelia dasythrysa, *Miq.* Ulu Gombak (Hume). A woody climber of Bangka and Borneo; in the Peninsula not common, Perak and Malacca.

Embelia garciniaefolia, *Wall.* K. Lumpur (Ridley). A slender woody climber of Indo-Malaya and China; in the Peninsula common on forest edges.

Embelia Lampani, *Scheff.* Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Rantau Panjang. A climbing shrub of Sumatra; in the Peninsula Penang to Singapore, in forest.

Embelia myrtillos, *Kurz.* Seminyih (Hume). An erect or climbing shrub of Burma; in the Peninsula usually a mountain plant, Kedah to Mt. Ophir.

Labisia pothoina, *Lindl.* Batang Berjuntai; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrublet of W. Malaysia; in the Peninsula common in forest.

Ardisia andamanica, *Kurz.* Ulu Gombak (Forest Dept.). A shrub of Tenasserim; in the Peninsula not uncommon in forest, usually montane.

Ardisia colorata, *Roxb.* Klang Gates; Pudu; Seminyih; Sungai Buloh (var. *complanata*, *Clarke*); Weld's Hill (var. *polyneura*, *Clarke*). A shrub of Indo-Malaya; in the Peninsula common and variable in forest.

Ardisia crenata, *Roxb.* K. Lumpur (Ridley). A bush of Indo-Malaya, China and Japan; in the Peninsula common in open country and secondary growth.

Ardisia lanceolata, *Roxb.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh. A small tree of W. Malaysia to the Philippines; in the Peninsula common in forest.

Ardisia littoralis, *Andr.* K. Lumpur (Forest Dept.). A bush of Indo-Malaya to the Philippines and China; in the Peninsula common on seacoasts.

Ardisia odontophylla, *Wall.* Petaling (Ridley). An undershrub of India and Borneo; in the Peninsula Perak, Pahang and Malacca, in forest.

Ardisia oxyphylla, *Wall.* Ulu Gombak (Hume). A shrub or small tree of Tenasserim, Lower Siam and Borneo; in the Peninsula Setul to Mt. Ophir, in forest.

Ardisia pachysandra, *Mez.* Weld's Hill (Forest Dept.). A shrub or small tree of ? Borneo; in the Peninsula not common in forest, Kedah Peak, Penang, Perak, Johore.

Ardisia Ridleyi, *King and Gamble.* Ulu Gombak (Hume). A shrub of Sumatra; in the Peninsula not common, but widely spread, Langkawi to Singapore.

Ardisia sinuata, *King and Gamble.* Batang Berjuntai; K. Lumpur. A shrub or small tree, endemic, rare, Kota and Gopeng, Perak.

Ardisia solanacea, *Roxb.* Damansara (Forest Dept.). A shrub or tree of India, Burma and Tenasserim; in the Peninsula not common in forest, Perak.

Ardisia tuberculata, *Wall.* Batu Caves (Ridley). A shrub of Bangka; in the Peninsula common in forest in the south.

Ardisia villosa, *Roxb.* Dusun Tua, Klang Gates; K. Lumpur; Rantau Panjang; Seminyih; Sungai Buloh; Ulu Gombak. A small shrub of Indo-Malaya and Indo-China; in the Peninsula common in forest from Kedah to Singapore.

Ardisia vinimea, *Ridl., Kew Bull., 10, 1926, p. 472.* Ulu Gombak (Hume 9676). A tall shrub, endemic and local.

Ardisia virens, *Kurz.* K. Lumpur; Seminyih. A shrub of Assam, Burma, Borneo and China; in the Peninsula not common in forest, montane in the Taiping Hills and Ulu Batang Padang.

Antistrophe caudata, *King and Gamble.* Ayer Hitam; Klang Gates; Seminyih; Ulu Gombak. A shrub or small tree, endemic, not common in forest, Taiping to Negri Sembilan.

SAPOTACEÆ.

(In dealing with the Sapotaceæ, Dr. H. J. Lam's recent monograph, *Bulletin du Jardin Botanique de Buitenzorg*, Serie 111, Vol. VII, Livr. 1-2, and Vol. VIII, Livr. 4, has been followed).

Chrysophyllum Roxburghii, *Don.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines; in the Peninsula Malacca and Singapore in forest.

Lucuma malaccensis, *Dubord.* *Sideroxylon malaccense*, Clarke. Maxwell Rd. and Weld's Hill, K. Lumpur (Forest Dept.). A tree of Lingga and Sumatra; in the Peninsula Penang to Singapore in forest.

Payena Havilandi, *King and Gamble.* Rantau Panjang (Hume). A tree of Borneo; in the Peninsula not uncommon in forest, Langkawi to Singapore.

Payena lucida, *DC.* Kanching; Klang Gates; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Sumatra and Borneo; in the Peninsula common in forest.

Payena Maingayi, *Clarke.* Kajang; Sungai Buloh; Ulu Gombak. A tall tree of ? Borneo; in the Peninsula common in forest.

Bassia ? elongata, *Miq.* Sungai Buloh (Forest Dept.). A tree of Sumatra; in the Peninsula rare and little known, Malacca. "Might be a *Palauium*, allied to *P. Gutta*, or to *P. elongatum* of the Philippines." "A relation with *Madhuca sericea* seems not impossible," H. J. Lam, l.c., p. 107.

Madhuca Dubardii, *H. J. Lam.* Ayer Hitam; Bukit Tunggal. A tree of Borneo; in the Peninsula rare in forest, known only from these localities.

Madhuca Korthalsii, *H. J. Lam.* *Bassia Braceana*, King and Gamble. Ulu Gombak; Weld's Hill. A tree of Sumatra, Borneo and New Britain; in the Peninsula Penang to Malacca in forest.

Madhuca laurifolia, *H. J. Lam.* *Bassia laurifolia*, King and Gamble. K. Lumpur; Ulu Gombak. A tree, endemic, Kedah, Penang, Perak, in forest.

Madhuca malaccensis, *H. J. Lam.* *Bassia malaccensis*, King and Gamble. Weld's Hill (Forest Dept.). A tree of Borneo; in the Peninsula Perak, Malacca, Singapore, in forest.

Madhuca sericea, *H. J. Lam.* *Bassia argentea*, Clarke. Sungai Buloh; Weld's Hill. A tall tree of Lingga, Bangka, Sumatra and Borneo; in the Peninsula Penang, Malacca, Singapore, in forest.

Madhuca utilis, *H. J. Lam.* *Payena utilis*, Ridl. Bukit Cheraka; Kajang; Rantau Panjang; Sungai Buloh. A lofty tree of Sumatra and ? Borneo; in the Peninsula not very common in forest, Perak, Pahang, Ulu Selangor and Johore.

Palaquium Clarkeanum, *King and Gamble.* K. Lumpur (Forest Dept.). A tall tree, endemic, not common in forest, Langkawi, Perak and Malacca.

Palaquium Gutta, *Burck.* (The Gutta Percha tree). Kanching; Kajang; K. Lumpur; Rantau Panjang; Sungai Buloh; Weld's Hill. A tall tree of W. Malaysia; in the Peninsula common in forest from Penang to Singapore.

Palaquium Maingayi, *King and Gamble.* Ampang; Kajang; Kanching; K. Lumpur; Rantau Panjang; Sungai Buloh. A tall tree, endemic, Perak, Negri Sembilan and Malacca, in forest.

Palaquium microphyllum, *King and Gamble.* 18th mile, Ginting Sempak Rd. (Strugnell, C. F. 11112). A tree of Lingga, Bangka, Sumatra and Borneo; in the Peninsula rare, hitherto known only from Singapore.

Palaquium obovatum, *Engl.* Weld's Hill (Forest Dept.). A tall tree of Indo-Malaya to the Philippines, and Indo-China; in the Peninsula common in forest in the south.

Palaquium Oxleyanum, *Pierre.* K. Lumpur; Rantau Panjang. A tall tree, endemic, Perak, Pahang, Singapore, in forest.

Palaquium stellatum, *King and Gamble.* Sungai Buloh (Forest Dept.). A tree of Sumatra; in the Peninsula not common in forest, Kedah, Perak, Pahang.

CULTIVATED SAPOTACEÆ.

Achras sapota, *Linn.* (The Chiku). A small tree of South American origin, pantropic in cultivation.

Mimusops Elengi, *Linn.* Cultivated as a roadside tree. H. J. Lam, l.c. p. 237, thinks it probably wild throughout Indo-Australia, especially near the seashore.

EBENACEÆ.

Diospyros argentea, *Griff.* Petaling; Weld's Hill. A shrub, endemic and common in forest from the Taiping Hills to Singapore.

Diospyros clavigera, *Clarke*, var. *pachyphylla*, *Ridl.* Weld's Hill (Forest Dept.). A tree, endemic, the species from Perlis to Singapore, the var. in Malacca and Singapore, in forest.

Diospyros graciliflora, *Hiern.* Klang Gates; Rantau Panjang; Ulu Gombak; Weld's Hill. A small tree of Java and Borneo; in the Peninsula Kedah, Penang and Perak, in forest.

Diospyros ? Kurzii, *Hiern*. Batu Caves (Ridley). A tree of the Andaman Islands; in the Peninsula known only from this locality.

Diospyros latisejala, *Ridl*. Kanching; K. Lumpur; Sungai Buloh. A tree, endemic, not common in forest, Perak, Negri Sembilan and Malacca.

Diospyros lucida, *Wall*. K. Lumpur (Forest Dept.). A shrub or small tree of Lower Siam and St. Barbe Isle; in the Peninsula common in forest and near the sea from Penang to Singapore.

Diospyros Scortechinii, *King and Gamble*. Rawang (Ridley). A tree, endemic, Penang to Selangor, usually in montane forest.

Diospyros subrhomboides, *King and Gamble*. Batu Caves (Ridley). A shrub of Sumatra; in the Peninsula not common in forest, Taiping Hills, Semangkok Pass.

Diospyros toposioides, *King and Gamble*. Batu Caves (Curtis). A small tree, endemic, Perak and the Dindings, usually on limestone.

Diospyros Wallichii, *King and Gamble*. Batu Caves; K. Lumpur. A tree of Lower Siam; in the Peninsula common in forest from Langkawi to Malacca.

CULTIVATED EBENACEÆ.

Diospyros discolor, *Willd*. (Butter fruit). K. Lumpur (Agri. Dept.). A tree of the Philippines; not commonly cultivated in the Peninsula.

STYRACACEÆ.

Styrax Benzoin, *Dryand*. Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A tall tree of Sumatra and Borneo; in the Peninsula common in forest from Taiping to Singapore.

Symplocos adenophylla, *Wall*. Ulu Gombak (Hume). A shrub or small tree of Sumatra, Bangka, Borneo and the Philippines; in the Peninsula common in montane forest and near the sea from Kedah to Singapore.

Symplocos Curtisii, *Oliv*. Seminyih (Hume). A shrub or small tree, endemic, not common, usually montane, Penang, Perak and Pahang.

Symplocos fasciculata, *Zoll*. Batu Caves; K. Lumpur; Seminyih. A tree of W. Malaysia; in the Peninsula common in open places and secondary growth from Taiping to Singapore.

Symplocos nivea, *Brand*. Weld's Hill (Forest Dept. 1593). A tree, endemic and rare, Penang.

Symplocos perakensis, *King and Gamble*. K. Lumpur (Ridley). A tree, endemic, not very common, Perak and Pahang, in forest.

Symplocos rigida, *Clarke*. Sungai Buloh (Forest Dept.). A tree, endemic, common in forest from Taiping to Singapore.

Symplocos rubiginosa, *Wall*. Weld's Hill (Forest Dept.). A shrub or small tree of Sumatra and Borneo; in the Peninsula Penang to Singapore, in forest.

OLEACEÆ.

Jasminum bifarium, *Wall*. Batu Caves; Klang Gates; K. Lumpur. A sprawling bush of W. Malaysia to the Philippines; in the Peninsula very common in open country from Kedah to Singapore.

Jasminum Griffithii, *Clarke*. Batu Caves (Ridley). A slender climbing shrub, endemic, Penang to Singapore, in forest.

Jasminum Maingayi, *Clarke*. Klang Gates (Ridley). A climbing shrub, endemic, Perlis to Johore in forest, often montane.

Jasminum Wrayi, *King and Gamble*. Batu Caves (Curtis). A slender climber, endemic, not common, Perak.

Linociera spicifera, *Ridl*. Rawang (Kloss, fide Ridley). A tree, endemic and local.

Olea maritima, *Wall*. Public Gardens, K. Lumpur (Forest Dept.). A shrub of W. Malaysia; in the Peninsula common in open country and near the sea.

CULTIVATED OLEACEÆ.

Jasminum Sambac, *Ait*. Common in gardens. A bush of India, Burma and Siam, cultivated in all tropics.

APOCYNACEÆ.

Willughbeia coriacea, *Wall*. Sungai Buloh (Forest Dept.). A liane, endemic and common in forest from Langkawi to Singapore.

Willughbeia firma, *Bl*. Klang Gates (Forest Dept.). A liane of W. Malaysia; in the Peninsula common in forest from Langkawi to Singapore.

Willughbeia tenuiflora, *Dyer*. Sungai Buloh (Forest Dept.). A liane of Sumatra and Borneo; in the Peninsula common in forest in the south.

Chilocarpus atroviridis, *Bl*. Batang Berjuntai; Batu Caves. A slender climbing shrub of Tavoy and Mergui; in the Peninsula Taiping Hills, Malacca, in forest.

Chilocarpus Cantleyi, *King and Gamble*. K. Lumpur. A climbing shrub, endemic and rare, Perak and Lower Perak,

Chilocarpus costatus, *Miq.* Ampang; Klang Gates; K. Lumpur; Sungai Buloh; Seminyih; Weld's Hill. A climbing shrub of Sumatra; in the Peninsula Penang to Malacca in forest.

Chilocarpus decipiens, *Hook. fil.* Batang Berjuntai; Batu Caves. A slender liane, endemic, not common in forest, Malacca.

Leuconotis Griffithii, *Hook. fil.* K. Lumpur; Sungai Buloh. A climbing shrub, endemic, Taiping, Negri Sembilan, Malacca and Singapore, in secondary growth.

Leuconotis Maingayi, *Dyer.* Bukit Cheraka; Sungai Buloh; Weld's Hill. A climbing shrub, endemic, not common, Singapore.

Alyxia selangorica, *King and Gamble.* Top of the Batu Caves (Ridley). A slender climbing shrub of Sumatra; in the Peninsula very rare, known only from this locality.

Hunteria corymbosa, *Roxb.* Batu Caves; Bukit Belachan; Kajang; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of India, Ceylon and Sumatra; in the Peninsula not uncommon in forest from Langkawi to Negri Sembilan.

Rauwolfia perakensis, *King and Gamble.* Batu Caves (Ridley). A shrub of Lower Siam; in the Peninsula common in open places in the north.

Kopsia Ridleyana, *King and Gamble.* Rawang; Sungai Buloh. A small shrub, endemic, local, but common in Negri Sembilan.

Kopsia singapurensis, *Ridl.* Public Gardens, K. Lumpur (Forest Dept.). A shrub or small tree, endemic, not common in forest in the south.

Ervatamia Curtisii, *King and Gamble.* Seminyih (Hume). A shrub, endemic not common in forest, Penang, Perak and Pahang.

Ervatamia cylindrocarpa, *King and Gamble.* Batang Berjuntai; Klang Gates; Rantau Panjang; Sungai Buloh; Weld's Hill. A shrub, endemic, Penang and Upper Perak to Malacca, in forest.

Ervatamia malaccensis, *King and Gamble.* Batu Caves; K. Lumpur. A shrub, endemic, common in forest from Penang to Singapore.

Ervatamia peduncularis, *King and Gamble.* Batu Caves; Seminyih; Ulu Gombak. A shrub, endemic, common in forest from Langkawi to Mt. Ophir.

Ervatamia polyneura, *King and Gamble.* Public Gardens, K. Lumpur (Forest Dept.). A big shrub, endemic, usually in montane forest on the Main Range and Gunong Tahan.

Dyera costulata, *Hook. fil.* Kajang; K. Lumpur; Rantau Panjang; Sungai Buloh. A lofty tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Dyera laxiflora, *Hook. fil.* K. Lumpur; Sungai Buloh. A lofty tree, endemic and common in forest.

Alstonia angustiloba, *Miq.* Batu Caves (Forest Dept.). A lofty tree of Java, Borneo and the Philippines; in the Peninsula Penang, Taiping, Singapore, in forest.

Alstonia micrantha, *Ridl.* Rantau Panjang (Kloss, fide Ridley). A tree, endemic and local.

Alstonia scholaris, *R. Br.* Ampang; Batu Caves; Kajang; Klang Gates; K. Lumpur; Sungai Buloh. A tall tree of Africa and Indo-Australia; in the Peninsula Penang to Malacca in forest.

Alstonia spathulata, *Bl.* Ampang; K. Lumpur; Pudu. A tall tree of Java and Borneo; in the Peninsula Perak to Singapore in wet swampy forest.

Vallaris Maingayi, *Hook. fil.* Klang Gates; K. Lumpur. A tree, endemic, Penang, Negri Sembilan, Johore and Singapore in forest.

Pottsia cantoniensis, *Hook. & Arn.* Klang Gates; Seminyih; Ulu Gombak. A climbing shrub of India, Burma, Java and S. China; in the Peninsula Penang to Malacca in forest.

Wrightia laevis, *Hook. fil.* Dusun Tua; Seminyih. A shrub or small tree of Lower Siam and Sumatra; in the Peninsula not common in forest, Upper Perak, Pahang, Negri Sembilan, Mt. Ophir.

Strophanthus dichotomus, *DC.* K. Lumpur (Weld's Hill and the Public Gardens). A sarmentose shrub of Tenasserim and Java; in the Peninsula Perak to Singapore in open places.

Urceola elastica, *Roxb.* Ampang; Bukit Tinggi. A liane of Sumatra; in the Peninsula Penang to Malacca in forest.

Urceola malaccensis, *Hook. fil.* K. Lumpur (Curtis). A climbing shrub, endemic, Perak to Singapore, in forest.

Parameria polyneura, *Hook. fil.* Ampang; K. Lumpur. A liane of Burma, Tenasserim, Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Ischnocarpus ovalifolius, *A. DC.* K. Lumpur (Ridley). A climbing shrub of Indo-Malaya to the Philippines; in the Peninsula common on riverbanks and in secondary growth from Penang to Johore.

Aganosma calycina, DC. 15th mile, Ulu Gombak (Forest Dept. 12891). A climbing shrub of Tavoy, rare in the Peninsula, hitherto known only from Gunong Chabang, Perak. (I have seen no other specimens of this, but the Ulu Gombak specimens agree well with the description).

Epigynum Maingayi, Hook. fil. K. Lumpur (Ridley). A climbing shrub, endemic, Perak, Pahang, Negri Sembilan and Malacca.

Epigynum Ridleyi, King and Gamble. Klang Gates; Rawang. A slender climbing shrub, endemic and rare, known also from Ginting Bidai, Selangor.

Microchites tenuifolia, Ridl. K. Lumpur; Sungai Buloh. A slender climbing shrub, endemic, not common in forest, Ginting Bidai and Malacca.

CULTIVATED APOCYNACEÆ.

Allamanda Schottii, Hook. fil. Common in gardens. A shrub of South America; in the Peninsula cultivated and occasionally escaping.

Beaumontia grandiflora, Wall. (Nepal Trumpet Flower). Public Gardens, K. Lumpur. A shrub of India.

Cerbera odollam, Gaertn. Serdang Experimental Plantation (Milsum). A small tree of Indo-Malaya to Polynesia; in the Peninsula not common on seashores.

Dipladenia Harrisii, Hook. fil. Public Gardens, K. Lumpur. A climbing shrub of Trinidad; in the Peninsula often cultivated.

Ervatamia coronaria, Stapf. Cultivated, fide Foxworthy. A shrub, cultivated in the Peninsula and occurring as an escape. Origin probably North India.

Lochnera rosea, Reichb. Cultivated and occasionally escaping. Native of America.

Nerium oleander, Linn. Cultivated, fide Foxworthy. A shrub of W. Asia; in the Peninsula cultivated only.

Ochrosia borbonica, Gmel. K. Lumpur (Forest Dept.), doubtless cultivated. A small tree of Indo-Malaya; in the Peninsula rare, Pulau Adang and Singapore.

Plumiera acutifolia, Poir. (The Frangipanni). A commonly cultivated shrub, native of South America.

Roupellia grata, Wall. (Cream Fruit). Public Gardens, K. Lumpur. A shrub of Trop. Africa.

Strophanthus hispidus, DC. Public Gardens, K. Lumpur (Forest Dept.). A shrub of Trop. Africa.

ASCLEPIADACEÆ.

Toxocarpus Griffithii, *Dcne.* Batu Caves (Ridley). A slender climber of Mergui; in the Peninsula not common in lowland forest, Perak, Malacca, Johore.

Asclepias curassavica, *Linn.* K. Lumpur (fide Foxworthy). A herb, pantropic, of American origin; in the Peninsula in waste ground, roadsides, etc.

Pentasacme caudatum, *Wall.* Ulu Gombak (Ridley). A slender herb of India and Burma; in the Peninsula common on rocks in mountain streams.

Marsdenia tinctoria, *Br.* Batu Caves; Ulu Gombak. A shrubby herb of Indo-Malaya to the Philippines and China; in the Peninsula Kedah and Perak, perhaps the remains of cultivation.

Pergularia accedens, *Bl.* Seminyih (Hume). A twining shrub of Sumatra and Java, not hitherto recorded from the Peninsula.

Tylophora exilis, *Colebr.* Rantau Panjang (Kloss, fide Ridley). A slender twiner of Assam; in the Peninsula Taiping to Malacca, in forest.

Tylophora longifolia, *Wight.* Rantau Panjang (Hume). A slender twiner of India and Borneo; in the Peninsula usually montane, Taiping Hills and Fraser Hill.

Tylophora tenuis, *Bl.* Batu Caves (Burkill). A slender climber of India to Burma, Java and Borneo; in the Peninsula common on tidal rivers, but also inland.

Heterostemma piperifolium, *King and Gamble.* Batu Caves (Burkill). A twiner, endemic, not common in forest, Perak.

Hoya citrina, *Ridl.* Batu Caves (Ridley). A long climber, endemic, not common, Perak on limestone.

Hoya coronaria, *Bl.* Sungai Buloh (Forest Dept.). A long twiner, widely Malaysian; in the Peninsula common on riverbanks and in mangrove.

Hoya lacunosa, *Bl.* Rawang; Sungai Buloh. A slender epiphyte of W. Malaysia; in the Peninsula Perak, Malacca, Singapore.

Hoya lasiantha, *Korth.* Seminyih; Ulu Gombak. An erect or climbing epiphytic shrub of Lower Siam, Java and Borneo; in the Peninsula not common in forest, Gunong Kerbau, Bujong Malacca.

Hoya multiflora, *Bl.* Seminyih; Ulu Gombak. An erect epiphytic shrub of Indo-Malaya; in the Peninsula common in forest from Penang to Johore.

Hoya occlusa, *Ridl.* Batu Caves (Ridley). A climber, endemic and local, rare.

Hoya parviflora, *Wight*. Ulu Gombak (Hume). A slender twiner of Tenasserim; in the Peninsula not rare, but not often flowering, Setul to Mt. Ophir.

Hoya revoluta, *Wight*. K. Lumpur; ? Ulu Gombak. A slender twiner, endemic, common in forest from Perlis and Kelantan to Singapore.

Dischidia complex, *Griff*. Batu Caves (Ridley). A slender epiphyte, endemic, rare and little known, recorded also from Malacca.

Dischidia hirsuta, *Dcne*. Batu Caves; Ulu Gombak. A slender epiphytic creeper of Indo-Malaya; in the Peninsula common from Penang to Singapore.

LOGANIACEÆ.

Norrisia malaccensis, *Gardn*. Sungai Buloh; Weld's Hill. A tree of Borneo; in the Peninsula common in forest from Perak to Singapore.

Fagraea auriculata, *Jack*. Klang Gates (all collectors). An epiphytic shrub, eventually a small tree, of W. Malaysia to the Philippines and Indo-China; in the Peninsula common in open places from Taiping to Singapore.

Fagraea crenulata, *Maing*. Wild on the Klang Road, cultivated at Circular Rd. Plantation. A tall tree, endemic, not common, Kedah to Malacca by tidal rivers.

Fagraea Maingayi *Clarke*. Bangi; K. Lumpur. A tree, endemic, not common, Ulu Selangor, Negri Sembilan, Malacca.

Fagraea obovata, *Wall*. Kanching; K. Lumpur; ? Ulu Gombak. An epiphytic shrub of Indo-Malaya; in the Peninsula common in forest from Kedah to Singapore.

Fagraea racemosa, *Jack*. Dusun Tua; K. Lumpur; Weld's Hill. A bush of Borneo; in the Peninsula common in open places from Kedah and Trengganu to Singapore.

Fagraea vaginata, *King and Gamble*. Ampang; Rawang. A shrub or small tree of Java; in the Peninsula Taiping to Malacca, in forest.

Cyrtophyllum giganteum, *Ridl*. Rantau Panjang; Sungai Buloh. A tall tree of Sumatra; in the Peninsula Perak to Singapore, in forest.

Cyrtophyllum peregrinum, *Bl*. K. Lumpur; Sungai Buloh. A tree of Indo-China and W. Malaysia to the Philippines; in the Peninsula common in open country.

Strychnos ovalifolia, *Wall*. Sungai Buloh (Forest Dept.). A liane of Borneo; in the Peninsula common in forest.

Strychnos Scortechinii, A. W. Hill. K. Lumpur (Curtis). A liane, endemic, Taiping to Malacca, in forest.

Gaertnera ? grisea, Hook. fl. Ulu Gombak (Hume).

GENTIANACEÆ.

Canscora pentanthera, Clarke. Batu Caves (Ridley). A herb of Lower Siam; in the Peninsula usually on limestone, Langkawi, Kedah Peak, Perak.

Limnanthemum indicum, Thw. K. Lumpur, fide Foxworthy. An aquatic herb of Indo-Malaya and China; in the Peninsula in ponds and ditches, Perlis, Langkawi, Malacca, Johore, Singapore.

BORAGINACEÆ.

Tournefortia Wallichii, DC. K. Lumpur; Petaling; Seminyih. A climber of W. Malaysia; in the Peninsula common from Penang to Singapore.

Heliotropium indicum, Linn. Circular Rd. Plantation (Forest Dept.), and doubtless in other localities. A pantropic herb; in the Peninsula a common weed in waste ground.

CONVOLVULACEÆ.

Erycibe angulata, Prain. Batu Caves; Batu Tiga. A liane of Sumatra; in the Peninsula not common in forest, Perak and Malacca.

Erycibe leucoxyloides, Prain. K. Lumpur (Curtis). A bushy climber, endemic, Fraser Hill, Johore and Singapore, in open places.

Lettsomia Curtisii, Prain. K. Lumpur (Ridley). A climbing shrub, endemic and rare, Taiping.

Lettsomia Kunstleri, Prain. Batu Caves; Sungai Buloh; Ulu Gombak. A climbing shrub of Sumatra; in the Peninsula Perak to Malacca, in forest.

Lettsomia Maingayi, Clarke. K. Lumpur; Ulu Gombak. A twining shrub, endemic, not uncommon in forest from Perak to Johore.

Lettsomia peguensis, Clarke. Batu Caves; Klang Gates; Petaling. A twining shrub of Burma, Tenasserim, Sumatra and Java; in the Peninsula common in forest from Langkawi and Kelantan to Negri Sembilan.

Lettsomia penangiana, Miq. Ulu Gombak (Hume). A slender climber, endemic, usually montane in Perak and Selangor.

Lettsomia Ridleyi, Prain. Bukit Raja; K. Lumpur. A large twining shrub, endemic, common in forest in Johore and Singapore, and occurring in Negri Sembilan.

Neuropeltis racemosa, Wall. Klang Gates (Hume). A climbing shrub of India, Burma and Borneo; in the Peninsula Kedah to Singapore.

Merremia convolvulacea, Dennst. K. Lumpur (Ridley). A slender twiner of Trop. Africa, Asia and Australia; in the Peninsula a common weed.

Merremia umbellata, Hallier. K. Lumpur (Curtis). A long twiner, pantropic; in the Peninsula common in open places.

Ipomoea sagittaeifolia, Burm. Pudu; Rantau Panjang. A slender twiner of S. E. Asia; in the Peninsula common in waste ground.

Lepistemon flavescens, Bl. Batu Caves; Sungai Buloh. A climber of Assam to the Philippines; in the Peninsula Penang to Malacca.

CULTIVATED CONVULVULACEÆ.

Ipomoea Batatas, Lam. (Sweet Potato). Native of America, commonly cultivated in all tropical countries.

Ipomoea pulchella, Roth. K. Lumpur, cultivated and running wild. A twiner of India and Indo-China; in the Peninsula cultivated only.

Porana volubilis, Burm. Public Gardens, K. Lumpur. A woody climber of Indo-Malaya, Indo-China and the Philippines; in the Peninsula cultivated only.

Quamoclit pinnata, Boj. Cultivated and sometimes escaping. A pantropic herb of S. American origin.

SOLANACEÆ.

Solanum Blumei, Nees. Batu Caves; Ulu Gombak. A shrub of W. Malaysia; in the Peninsula usually in hill woods, Perak to Johore.

Solanum nigrum, Linn. Seminyih (Hume). A herb, pantropic and in temperate regions; in the Peninsula common in waste ground and cultivated.

Solanum torvum, Sw. Ampang; Klang Gates; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A pantropic shrub; in the Peninsula common in waste ground.

Solanum verbascifolium Linn. K. Lumpur (Forest Dept., Goodenough). A pantropic shrub; in the Peninsula Kedah and Kelantan to Pulau Tioman, usually in open places.

Capsicum minimum, Roxb. Batu Caves, established here (Ridley). A shrubby herb of American origin, cultivated all over the Peninsula.

Physalis minima, Linn., var. *indica*, Clarke. Batang Berjuntai; Batu Caves; Pudu; K. Lumpur; Rantau Panjang; Ulu Gombak. A pantropic herb; in the Peninsula common on seashores and in waste ground.

CULTIVATED SOLANACEÆ.

Brunfelsia undulata, Sw. Public Gardens, K. Lumpur (Forest Dept.). A shrub of Jamaica; in the Peninsula occasionally cultivated.

Datura fastuosa, Linn. K. Lumpur, fide Foxworthy. A tall herb of Trop. Africa and S. E. Asia; in the Peninsula cultivated and in waste ground, not native.

Nicotianum tabacum, Linn. (Tobacco). A native of Trop. America, cultivated in all tropical countries.

SCROPHULARIACEÆ.

Adenosma capitatum, Benth. K. Lumpur; Salak. An aromatic herb of S. E. Asia; in the Peninsula common on roadsides and sandy places.

Adenosma coeruleum, R. Br. Batu Caves; Rantau Panjang. An aromatic herb of Trop. Asia to Australia; in the Peninsula common in grassy places.

Herpestis monniera, H. B. & K. Salak South Rd. (Seimund). A succulent herb, pantropic; in the Peninsula in ditches and ricefields, Penang and Kelantan to Singapore.

Limnophila erecta, Benth. Rawang; Sungai Buloh. An erect herb of India, Indo-China, China and Lower Siam; in the Peninsula in wet places from Upper Perak and Kelantan to Negri Sembilan.

Vandellia crustacea, Benth. Ampang; Batang Berjuntai; Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak. A small herb, pantropic; in the Peninsula a common weed.

Vandellia mollis, Benth. Rawang (Ridley). A creeping herb of India to China, Sumatra and Java; in the Peninsula rare, Upper Perak.

Vandellia pedunculata, Benth. Rantau Panjang; Rawang; Ulu Gombak. A herb of S. E. Asia; in the Peninsula common in damp places.

Torenia atropurpurea, Ridl. Ulu Gombak (Hume). A creeping herb, endemic, usually montane, Perak, Selangor.

Torenia mucronulata, Benth. Rantau Panjang (Hume). A creeping herb of Tenasserim; in the Peninsula Penang and Kelantan to Singapore.

Torenia polygonoides, Benth. Klang Gates; Rantau Panjang; Ulu Gombak. A creeping herb of Trop. Asia; in the Peninsula common in grassy places.

Curanga amara, Juss. Batu Caves (Ridley). A creeping herb of Indo-China and Indo-Malaya to the Philippines; in the Peninsula common in shady places, especially in the north.

Bonnaya brachiata, *Link & Otto*. Ulu Gombak (Hume). A small herb of China and Indo-Malaya to the Philippines; in the Peninsula common in wet places.

Bonnaya reptans, *Spreng*. Seminyih; Ulu Gombak. A tufted herb of Indo-Malaya to the Philippines; in the Peninsula common.

Striga hirsuta, *Benth*. Batang Berjuntai; Klang Gates; Seminyih. A herb, parasitic on grass roots, of India, Siam and Java; in the Peninsula common.

Scoparia dulcis, *Linn*. Batang Berjuntai; K. Lumpur; Ulu Gombak. A shrubby herb of American origin, now common in Africa and Indo-Malaya; in the Peninsula common in waste places.

CULTIVATED SCROPHULARIACEÆ.

Angelonia grandiflora, *C. Morr*. K. Lumpur, cultivated or an escape (Goodenough). A herb of America; in the Peninsula occasionally cultivated.

LENTIBULARIACEÆ.

Utricularia albina, *Ridl*. Salak (Seimund). A slender herb of Ceylon and Tenasserim; in the Peninsula not uncommon in ricefields and sandy grassy spots.

Utricularia bifida, *Linn*. Ampang (Hume). A small herb of Indo-Australia, China and Japan; in the Peninsula common in marshes and ricefields.

Utricularia flexuosa, *Vahl*. Ampang (Hume). An aquatic herb of Indo-Australia and Indo-China; in the Peninsula common in ponds and ditches.

GESNERACEÆ.

Aeschynanthus marmorata, *T. Moore*. Ulu Gombak (Hume). A tufted epiphyte of Burma and Siam; in the Peninsula Langkawi, Penang, Upper Perak, in forest.

Aeschynanthus obconica, *Clarke*. K. Lumpur; Sungai Buloh. A creeping epiphyte of Borneo; in the Peninsula Upper Perak to Selangor, in forest.

Aeschynanthus purpurascens, *Hassk*. Ulu Gombak (Hume). An erect epiphyte of W. Malaysia; in the Peninsula common in forest from Kelantan and Perak to Singapore.

Aeschynanthus radicans, *Jack*. Seminyih; Sungai Buloh; Ulu Gombak. A creeping epiphyte of W. Malaysia; in the Peninsula common in forest from Upper Perak and Trengganu to Singapore.

Didissandra breviflora, *Ridl., Kew Bull., 10, 1926, p. 474*. Ulu Gombak (Hume 8437). A herb, endemic and local.

Didymocarpus bombycina, *Ridl.* Ulu Gombak (Hume). A herb, endemic, not common in forest, Upper Perak and Kelantan to Negri Sembilan.

Didymocarpus crinita, *Jack.* Kanching; Seminyih. A woody herb of Sumatra and Borneo; in the Peninsula common in forest from Kedah to Johore.

Didymocarpus Kompsobœa, *Clarke.* Ulu Gombak (Hume). A woody herb of Borneo; in the Peninsula Upper Perak and Pahang, in forest, usually above 2000 feet altitude.

Didymocarpus malayana, *Hook. fil.* Rawang; Ulu Gombak. A herb, endemic, common in forest on the Taiping Hills and the Main Range above 1500 feet altitude.

Didymocarpus pectinatus, *Clarke and Oliv.* Rawang (Ridley). A herb, endemic, rare, on limestone in Perak and on Bukit Hitam, Selangor.

Didymocarpus platypus, *Clarke.* Batang Berjuntai; Kajang; Kanching; Klang Gates; K. Lumpur; Kuang; Petaling; Rantau Panjang; Seminyih. A woody herb of Sumatra; in the Peninsula common in forest in the south.

Didymocarpus primulina, *Ridl.* Woods at Klang Gates (Ridley). A herb, endemic and local.

Didymocarpus quinquevulnera, *Ridl.* Batu Tiga; Bukit Raja. A woody herb, endemic, Perak, Pahang, Malacca, in forest.

Didymocarpus reptans, *Jack.* Batang Berjuntai; Dusun Tua (var. *violascens*, *Ridl.*); Kanching; Klang Gates; Rantau Panjang (var. *modesta*, *Ridl.*); Rawang (var. *violascens*); Seminyih; Ulu Gombak (var. *modesta*); Weld's Hill. A creeping herb of Sumatra and Java; in the Peninsula common in forest on the Taiping Hills and the Main Range, the varieties known only from the localities given.

Chirita caliginosa, *Clarke.* Batu Caves (all collectors). A herb, endemic, on limestone from Upper Perak to Selangor.

Boea paniculata, *Ridl.* Batu Caves (Ridley). A woody herb, endemic, limestone rocks in Perak.

Boea verticillata, *Ridl.* Batu Caves (Kelsall, Ridley). A woody herb, endemic and local.

Epithema saxatile, *Bl.* Batu Caves (Ridley). A succulent herb of W. Malaysia; in the Peninsula common on limestone.

Monophyllæa Horsfieldii, *Br.* Batu Caves; Ulu Gombak. A succulent herb of Sumatra and Java; in the Peninsula usually on limestone.

Monophyllæa patens, *Ridl.* Batu Caves (Ridley). A succulent herb, endemic, not common, on limestone, Perak.

Stauroanthera umbrosa, *Clarke*. Batu Caves (Ridley). A succulent herb of Assam; in the Peninsula Upper Perak, Perak, Pahang, Johore, in forest.

Cyrtandromœa acuminata, *Benth. and Hook*. Seminyih; Ulu Gombak. A weak shrub of Sumatra; in the Peninsula common in forest in the north.

Cyrtandromœa grandis, *Ridl*. K. Lumpur; Petaling; Seminyih; Sungai Buloh; Ulu Gombak. A large shrub, endemic, Kelantan to Negri Sembilan, in forest.

Cyrtandromœa megaphylla, *Hemsl*. Weld's Hill (Ridley). A large bush, endemic, Kedah, Perak, Pahang, in forest.

Cyrtandra cupulata, *Ridl*. Kanching; Klang Gates; Seminyih; Sungai Buloh; Ulu Gombak. A shrub, endemic, common in forest from Upper Perak and Kelantan to Mt. Ophir.

Cyrtandra falcata, *Ridl*. Near Batu Caves (Ridley). A small epiphytic shrub, endemic, rare, Taiping.

Cyrtandra pendula, *Bl*. Batu Caves; K. Lumpur; Seminyih; Ulu Gombak. A small shrub of Sumatra and Java; in the Peninsula common in forest from Taiping to Singapore.

Cyrtandra pilosa, *Bl*. Seminyih (Hume). A shrub of Tenasserim to New Guinea; in the Peninsula Penang and Upper Perak to Johore, in forest.

BIGNONIACEÆ.

Oroxylum indicum, *Vent*. Weld's Hill (Forest Dept.), and doubtless in other localities. A small tree of Indo-Malaya and Indo-China; in the Peninsula common near rivers and in swamps.

Radermachera amœna, *Seem*. K. Lumpur (Ridley). A tree of Burma, Java and Borneo; in the Peninsula Perlis, Perak, Malacca, Singapore, in open places and secondary growth.

Radermachera stricta, *Zoll. and Mor*. Batu Caves; K. Lumpur; Ulu Gombak. A small tree of Indo-Malaya; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Diplanthera bancana, *Scheff*. Rantau Panjang (Hume). A tree of Bangka and Borneo; in the Peninsula not very common in forest, Penang to Malacca.

CULTIVATED BIGNONIACEÆ.

Bignonia magnifica, *Bull*. Public Gardens, K. Lumpur. A shrub of New Grenada, occasionally cultivated in the Peninsula.

Crescentia cujete, Linn. (The Calabash Tree). K. Lumpur (Forest Dept.). A tree of Trop. America; in the Peninsula occasionally cultivated.

Jacaranda mimosæfolia, R. Br. Common in gardens. A small tree of S. America; in the Peninsula often cultivated.

Spathodea campanulata, Beauv. Common in gardens and as a roadside tree. A native of Trop. Africa, often cultivated in the Peninsula.

Stereospermum fimbriatum, DC. K. Lumpur, cultivated, fide Foxworthy. A tall tree of Burma and Siam; in the Peninsula common north of Malacca.

PEDALINACEÆ, CULTIVATED.

Sesamum indicum, DC. (Gingelly Oil plant.) Cultivated and escaping. A herb, cultivated in all tropics.

ACANTHACEÆ.

Thunbergia fragrans, Roxb., var *javanica*, King and Gamble. Batang Berjuntai; Batu Caves; Klang Gates. A twining herb of Indo-Australia; in the Peninsula the species cultivated and perhaps wild in the north, the var. common on limestone and in villages.

Thunbergia laurifolia, Lindl. K. Lumpur, fide Foxworthy. A liane of Burma; in the Peninsula common in the north, in forest or open places.

Staurogyne angustifolia, Wall. Ulu Gombak (Ridley.) A herb of Tenasserim; in the Peninsula not common in forest, Perak and Malacca.

Staurogyne comosa, Kuntze. Rawang; Sungai Buloh. A woody herb, endemic, Penang and Upper Perak to Selangor, in forest.

Staurogyne Griffithiana, Kuntze. Seminyih; Ulu Gombak. A creeping herb, endemic, common in forest from Upper Perak and Kelantan to Singapore.

Staurogyne Kingiana, Clarke. Klang Gates; Ulu Gombak. A herb of Lingga; in the Peninsula Kedah to Johore, in forest.

Staurogyne longispica, Ridl. Ulu Gombak (Hume, Ridley). A herb, endemic and rare in forest, Bukit Tangga (Negri Sembilan).

Staurogyne longifolia, Kuntze. Batang Berjuntai; Batu Caves; K. Lumpur; Kuang; Ulu Gombak. A herb, endemic, usually in hill forest, Upper Perak to Johore.

Staurogyne setigera, Kuntze. Batang Berjuntai; K. Lumpur; Rawang. A herb of W. Malaysia; in the Peninsula common.

Ruellia repens, *Linn.* K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A small herb of Indo-Malaya and China; in the Peninsula common in grass.

Aporuella sumatrensis, *Clarke*, var. *Ridleyi*, *Clarke*. Batu Caves (Ridley, Curtis). A herb, the species of Sumatra, the var, endemic and rare, known only from this locality.

Hygrophila angustifolia, *R. Br.* Batu Caves; K. Lumpur. A herb of Indo-Malaya, China and Japan; in the Peninsula common in wet places.

Hygrophila phlomoides, *Nees*. Batu Caves; Pudu; Ulu Gombak. A herb of Indo-China, Borneo and the Philippines; in the Peninsula common in wet places.

Hygrophila quadrivalvis, *Nees*. Salak South Rd. (Seimund). A stout herb of Indo-Malaya and Indo-China; in the Peninsula common in marshes.

Gymnostachyum Ridleyi, *Clarke*. Rawang (Ridley). A tall shrub, endemic and rare, Bujong Malacca (Perak).

Lepidagathis longifolia, *Wight*. Bukit Raja; K. Lumpur; Petaling; Sungai Buloh; Ulu Gombak. A shrubby herb of Lingga; in the Peninsula common in forest from Perak to Johore.

Pseuderanthemum candidum, *Ridl.* Ulu Gombak (Ridley). A small shrub, endemic and local.

Pseuderanthemum ?caudifolium, *Ridl.* Ulu Gombak (Hume).

Pseuderanthemum crenulatum, *Radlk.* Batu Caves; K. Lumpur; Seminyih; Ulu Gombak. A small shrub of Burma, Siam, Tenasserim and Indo-China; in the Peninsula common in forest.

Pseuderanthemum graciliflorum, *Ridl.* Klang Gates; Rantau Panjang; Sungai Buloh; Ulu Gombak. A bush of Lower Siam; in the Peninsula common in forest and often cultivated.

Pseuderanthemum lilacinum, *Stapf*. Batu Caves (Ridley). Ridley believes this to be *P. Teysmanni* altered by cultivation (*Ridl. Flor. Malay Pen. Vol. II, p. 591*).

Pseuderanthemum selangorensis, *Ridl.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh. A shrub, endemic, not common in forest, Upper Perak, Ulu Selangor, Bukit Hitam.

Pseuderanthemum sylvestre, *Ridl.* Sungai Buloh (Ridley). A shrub, endemic and local.

Pseuderanthemum Teysmanni, *Ridl.* Batu Caves; Seminyih; Sungai Buloh. A sarmentose shrub, endemic and common in forest from Upper Perak to Johore.

Calophanoides quadrifaria, *Ridl.* Batu Caves (Curtis). A small shrub of India, Tenasserim, Sumatra and China; in the Peninsula Upper Perak, Kelantan, Singapore, by river-banks.

Justicia ?Maingayi, *Clarke.* Ulu Gombak (Hume).

Justicia microcarpa, *Ridl.* Batu Caves (Ridley). A weak herb, endemic and local.

Justicia ptychostoma, *Nees.* Batu Caves (Ridley.) A herb, endemic, common from Perlis to Malacca in open country.

Justicia subcymosa, *Clarke.* Batu Caves; Dusun Tua; Seminyih. A herb, endemic, common in the north, in forest and secondary growth.

Justicia trichodes, *Ridl., Kew Bull, 10, 1926, p. 475.* Seminyih (Hume 7816, 8165). A herb, endemic and local.

Justicia uber, *Clarke.* Batu Caves; Seminyih; Ulu Gombak. A fleshy herb, endemic and common in forest, Upper Perak and Kelantan to Malacca.

Ptyssiglottis chrysea, *Ridl.* Rantau Panjang (Hume); Ulu Gombak (Ridley). A woody herb, endemic and local in forest, rare.

Polytrema æquale, *Ridl.* Batu Caves (Ridley). A herb, endemic, not common in forest, Bukit Besar (Rahman), Gunong Senyum (Pahang), Bukit Tangga (Negri Sembilan).

Polytrema vulgare, *Clarke.* K. Lumpur (Curtis). A shrubby herb of Lower Siam; in the Peninsula Penang and Upper Perak to Johore in forest.

Peristrophe acuminata, *Nees.* Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak. A herb of Indo-Malaya; in the Peninsula common by roadsides and in waste ground.

CULTIVATED ACANTHACEÆ.

Barleria prionitis, *Linn.* K. Lumpur, cultivated or escaping (Forest Dept.). A herb of Africa and India; in the Peninsula cultivated and perhaps wild in Perlis.

Gendarussa vulgaris, *Nees.* Cultivated, fide Foxworthy. A bush of S. E. Asia; in the Peninsula common in or near cultivation.

Graptophyllum hortense, *Nees.* Common in gardens. A shrub of unknown origin, cultivated throughout India and Malaya.

Jacobinia magnifica, *Benth. and Hook!* Weld's Hill (Forest Dept.), cultivated or an escape. A shrub of Brazil.

Sanchezia nobilis, *Hook. fl.* Public Gardens, K. Lumpur (Forest Dept.). A shrub of Ecuador, occasionally cultivated in the Peninsula.

Thunbergia grandiflora, *Roxb.* Public Gardens, K. Lumpur (Forest Dept.). A long climber of India; in the Peninsula cultivated and occasionally escaping.

VERBENACEÆ.

Lantana aculeata, *Linn.* Klang Gates; K. Lumpur; Pudu; Ulu Gombak; and doubtless in all the other localities. A prickly bush, pantropic, of S. American origin; in the Peninsula very common in open places and waste ground.

Lippia nodiflora, *Mich.* Salak South Rd. (Seimund). A creeping herb, pantropic; in the Peninsula occasional in waste ground.

Stachytarpheta indica, *Vahl.* K. Lumpur; Rantau Panjang. A small shrub of Indo-Malaya; in the Peninsula common, often on seashores and sandy places.

Stachytarpheta jamaicensis, *Vahl.* K. Lumpur; Pudu; Seminyih; Ulu Gombak, and doubtless in most of the other localities. A shrub, pantropic, of S. American origin; in the Peninsula a common weed.

Geunsia farinosa, *Bl.* Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Rawang; Seminyih; Ulu Gombak. A tree of Indo-Malaya to the Philippines and Moluccas; in the Peninsula common in open country.

Callicarpa angustifolia, *King and Gamble.* Batu Caves (Ridley). A shrub, endemic on limestone in Langkawi and Perak.

Callicarpa longifolia, *Lam.* Ampang; Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrub of Sumatra to N. Australia; in the Peninsula common in open places and secondary growth from Langkawi to Singapore.

Callicarpa Maingayi, *King and Gamble.* Ulu Gombak (Hume). A tree, endemic, not common in forest in Selangor, Pahang and Malacca.

Premna pyramidata, *Wall.* Dusun Tua (Ridley). A tree of Burma, Java and Timor; in the Peninsula Langkawi to Negri Sembilan, in forest.

Clerodendron deflexum, *Wall.* Batu Caves; Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A shrub, endemic and common in forest from Penang and Upper Perak to Singapore.

Clerodendron disparifolium, *Bl.* Kanching; Rawang; Ulu Gombak. A small tree of W. Malaysia; in the Peninsula common.

Clerodendron paniculatum, *Linn.* K. Lumpur; Ulu Gombak. A tall shrub of Java; in the Peninsula common in waste ground and often cultivated.

Clerodendron penduliflorum, *Wall.* Batu Caves (Ridley). A small shrub of Burma and the Nicobar Islands; in the Peninsula not rare in open country in the north.

Clerodendron Ridleyi, *King and Gamble.* Batu Tiga (Ridley). A shrub or small tree of Borneo; in the Peninsula rare, Larut.

Clerodendron serratum, *Spreng.* Pudu; Weld's Hill. A shrub of Indo-Malaya and Indo-China; in the Peninsula common in open country in the north.

Clerodendron umbratile, *King and Gamble.* Seminyih (Hume). A shrub of Sumatra; in the Peninsula usually in montane forest, Taiping Hills to Malacca.

Clerodendron villosum, *Bl.* Weld's Hill (Forest Dept.). A shrub of Indo-Malaya to the Philippines; in the Peninsula common in waste ground.

Vitex gamosepala, *Griff.* Ampang; K. Lumpur; Rantau Panjang; Ulu Gombak. A small tree of Sumatra and Borneo; in the Peninsula Perak and Trengganu to Singapore, in forest.

Vitex heterophylla, *Roxb.* Ulu Gombak (Forest Dept.). A tree of Indo-Malaya; in the Peninsula not common in forest, Perak.

Vitex longisepala, *King and Gamble.* Dusun Tua; Kanching; Klang Gates; Rantau Panjang; Rawang; Seminyih. A small tree, endemic, common in forest from Penang to Malacca.

Vitex Negundo, *Linn.* Kajang (Forest Dept.). A shrub of Indo-Malaya; in the Peninsula not common in waste ground, probably introduced (Ridley).

Vitex pubescens, *Vahl.* Bangi; Batang Berjuntai; Bukit Belachan; Bukit Cheraka; Bukit Puteh; K. Lumpur; Sungai Buloh. A tree of Indo-Malaya to the Philippines; in the Peninsula common in open country from Perlis to Singapore.

Vitex siamica, *Williams.* Batu Caves (Ridley). A small tree, endemic on limestone, Langkawi and Perak.

Vitex trifolia, *Linn.* K. Lumpur; Salak South Rd. A shrub or small tree of Indo-Australia and Japan; in the Peninsula Langkawi to Singapore in open places and seashores.

Vitex vestita, *Wall.* Batu Caves; Bukit Cheraka; Batu Tiga; Klang Gates; K. Lumpur; Rawang; Ulu Gombak. A small tree of Burma, Sumatra and Borneo; in the Peninsula common in forest.

Peronema canescens, *Jack.* K. Lumpur (Forest Dept.). A shrub or tree of W. Malaysia; in the Peninsula common from Penang and Kelantan to Singapore, usually on river-banks.

Sphenodesme pentandra, *Jack.* Ulu Gombak (Forest Dept.). A climbing shrub of India, Siam and Borneo; in the Peninsula common in open places and forest edges.

Sphenodesme triflora, *Wight.* K. Lumpur; Sungai Buloh. A climber or erect shrub of Sumatra and Borneo; in the Peninsula common from Langkawi to Johore in forest and secondary growth.

CULTIVATED VERBENACEÆ.

Clerodendron fragrans, *R. Br.* A shrub of Chinese origin, cultivated and run wild in the Peninsula.

Clerodendron siphonanthus, *Br.* Batu Tiga; Public Gardens, K. Lumpur. A shrub of Indo-Malaya; wild in Kedah, Perak and Pahang, and often cultivated and escaping.

Clerodendron Thomsonæ, *Balf.* Common in gardens. A climber of Africa; in the Peninsula often cultivated.

Congea velutina, *Wight.* Common in gardens. A climbing shrub of Burma and Siam; in the Peninsula often cultivated.

Duranta Plumieri, *Jacq.* K. Lumpur, fide Foxworthy. A shrub of South America.

Faradaya papuana, *Scheff.* Public Gardens, K. Lumpur. A climber of New Guinea, occasionally cultivated in the Peninsula.

Holmskioldia sanguinea, *Retz.* Public Gardens, K. Lumpur (Forest Dept.). A climbing shrub of the Eastern subtropical Himalaya; in the Peninsula occasionally cultivated.

Stachytarpheta mutabilis, *Vahl.* K. Lumpur (Ridley). A shrub of Trop. America; in the Peninsula cultivated only.

Tectona grandis, *Linn.* (Teak). Occasionally cultivated. Native of India, Burma, Siam, Sumatra and Java (fide King and Gamble), not wild in the Peninsula.

LABIATÆ.

Hyptis brevipes, *Poit.* Batu Caves; K. Lumpur; Rawang; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula common in open places and waste ground.

Hyptis suaveolens, *Poit.* Klang Gates; K. Lumpur; Rantau Panjang; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula a very common weed.

Coleus atropurpureus, *Benth.* K. Lumpur (Ridley). A herb of W. Malaysia to Polynesia; in the Peninsula common in open places.

Pogostemon Heyneanus, *Benth.* Rawang (Ridley). An aromatic herb of Indo-Malaya to the Philippines; in the Peninsula by riverbanks in Upper Perak, Pahang, Negri Sembilan and Johore.

Dysophylla auricularia, *Bl.* Batang Berjuntai; Rantau Panjang; Seminyih; Ulu Gombak. A herb of S. E. Asia; in the Peninsula common in open places.

Anisomeles ovata, *R. Br.* K. Lumpur; Ulu Gombak road. A stout herb of Indo-Malaya and China; in the Peninsula not very common in waste ground.

Leucas zeylanica, *R. Br.* Ampang; Batang Berjuntai; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak; and doubtless in all the other localities. A herb of S. E. Asia; in the Peninsula a very common weed.

Leonurus sibiricus, *Linn.* Pudu (Goodenough); cultivated, fide Foxworthy. A pantropic herb; in the Peninsula in waste ground and often cultivated.

Gomphostemma crinitum, *Wall.* Batu Caves (var. *Griffithii*, *Prain*); Ulu Gombak. A woody herb of Tenasserim; in the Peninsula common in forest above 1,000 feet altitude.

Gomphostemma oblongum, *Wall.* Seminyih (Hume). A large woody herb of India and Indo-China; in the Peninsula Kedah, Perak, Pahang, Johore, not very common in forest.

Gomphostemma Scortechinii, *Prain.* Seminyih (Hume). A woody herb of Tenasserim; in the Peninsula not common in forest, Taiping Hills and Kelantan.

Acrymia ajugiflora, *Prain.* Kanching, on limestone (Ridley). A creeping undershrub, rare, Perak.

CULTIVATED LABIATÆ.

Mentha javanica, *Bl.* Cultivated, fide Foxworthy. A herb of Ceylon and the Malay Islands, probably only a form of the cultivated mint (Ridley).

Ocimum basilicum, *Linn.* K. Lumpur (Ridley). A small bushy shrub, pantropic; in the Peninsula cultivated only.

Ocimum sanctum, *Linn.* Cultivated, fide Foxworthy. A small herb, pantropic; in the Peninsula cultivated, doubtfully wild.

Pogostemon Cablin, *Benth.* (Patchouli). A strongly scented herb, not known in a wild state, widely cultivated in Indo-Malaya.

Salvia coccinea, *Juss.* Common in gardens. A herb of America; cultivated in Africa and S. E. Asia.

NYCTAGINACEÆ, CULTIVATED.

Bougainvillæa glabra, *Choisy.* Common in gardens. A scrambling shrub of Brazil, often cultivated in the Peninsula.

AMARANTACEÆ.

Celosia argentea, *Linn.* Pudu (Hume). A pantropic herb; in the Peninsula in waste ground, Upper Perak, Kelantan, Pahang, Singapore.

Amaranthus caudatus, *Linn.* K. Lumpur (Ridley). A pantropic herb; in the Peninsula cultivated and wild in waste ground.

Amaranthus gangeticus, *Linn.* Seminyih (Hume). A cosmopolitan herb; in the Peninsula a weed of cultivation.

Amaranthus spinosus, *Linn.* K. Lumpur; Pudu; Ulu Gombak. A herb, pantropic; in the Peninsula a common weed from Penang to Singapore.

Amaranthus viridis, *Linn.* K. Lumpur; Rantau Panjang; Ulu Gombak. A cosmopolitan herb; in the Peninsula very common in waste ground.

Cyathula prostrata, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Sungai Buloh (var. *major*, *Ridl.*); Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula very common in open places and waste ground.

Acryanthos aspera, *Linn.* K. Lumpur, fide Foxworthy. A woody herb of the Tropics of the Old World; in the Peninsula common in open places and waste ground from Penang to Singapore.

Alternanthera sessilis, *Brown.* Ampang; K. Lumpur; Ulu Gombak. A prostrate herb, pantropic; in the Peninsula very common in waste ground.

CULTIVATED AMARANTACEÆ.

Amaranthus paniculatus, *Linn.* K. Lumpur (Ridley). A North American herb, cultivated in the Peninsula.

Celosia cristata, *Linn.* ("Cock's comb"). A pantropic herb of unknown origin, often cultivated in the Peninsula as an ornamental plant.

POLYGONACEÆ.

Polygonum barbatum, *Linn.* K. Lumpur; Ulu Gombak. A herb of the Tropics of the Old World; in the Peninsula common in wet places.

Polygonum flaccidum, *Meissn.* K. Lumpur (Good-enough). A tall herb of Indo-Malaya and China; in the Peninsula in damp places in Kelantan, Perak, Pahang and Negri Sembilan.

Polygonum minus, *Huds.* K. Lumpur; Petaling. A slender herb of Europe, Asia and Australia; in the Peninsula not uncommon in wet places.

Polygonum pedunculare, *Wall.* Batu Caves; Dusun Tua; Klang Gates; K. Lumpur. An aquatic herb of Indo-Australia and China; in the Peninsula common in ponds and ditches.

CULTIVATED POLYGONACEÆ.

Antigonon leptopus, *Hook. and Arn.* (Honolulu creeper). Common in gardens. A climber of Tropical Africa; in the Peninsula much cultivated.

ARISTOLOCHIACEÆ.

Apama corymbosa, *Soler.* Batang Berjuntai; Batu Caves; Bukit Raja; Kanching; Klang Gates; K. Lumpur; Seminyih; Ulu Gombak. A shrub of Sumatra; in the Peninsula common in forest from Penang to Malacca.

Thottea dependens, *Klotzsch.* Pudu (Hume). A shrub, endemic, not very common in forest, Penang to Singapore.

Thottea grandiflora, *Rottb.* Ulu Gombak; Weld's Hill. A shrub of Borneo; in the Peninsula common in forest in the south.

Aristolochia Tagala, *Cham.* Dusun Tua (Ridley). A slender climber of Indo-Malaya to the Philippines; in the Peninsula common from Penang and Kelantan to Malacca, in open places.

NEPENTHACEÆ.

Nepenthes ampullaria, *Jack.* Rantau Panjang (Kloss, fide Ridley). A climbing shrub of Sumatra, Borneo and the Philippines; in the Peninsula common in the lowlands from Penang to Singapore.

Nepenthes angustifolia, *Mast.* Rantau Panjang (Kloss, fide Ridley). A creeping plant of Borneo; in the Peninsula rare, known only from this locality. Ridley, *Flor. Mal. Pen.* V. p. 327, suspects this to be a young prostrate form of one of the lowland species.

PIPERACEÆ.

Peperomia dindigulensis, *Miq.* Batu Caves (Ridley). A small succulent herb of South India; in the Peninsula rare on limestone, Kota Glanggi (Pahang).

Peperomia pellucida, Korth. K. Lumpur; Seminyih; Ulu Gombak. A pantropic herb of S. American origin; in the Peninsula common in waste ground.

Peperomia portulacoides, A. Dietr. Batu Caves (Ridley). A succulent herb of India and the Mascarene Islands; in the Peninsula rare, known only from this locality.

Piper argyrites, Ridl. Batu Caves (Ridley). A stout climbing shrub, endemic and rare in forest, Ginting Bidai.

Piper boehmeriaefolium, Wall. Ulu Gombak (Hume). An erect shrub of E. Himalaya to Siam; in the Peninsula in forest in Perak, Pahang and Negri Sembilan.

Piper caninum, Bl. Batu Caves; Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A slender climbing shrub of Indo-Malaya to the Philippines; in the Peninsula common in forest.

Piper Curtisii, C. DC. K. Lumpur; Ulu Gombak. A climbing shrub, endemic, Upper Perak to Johore, in forest.

Piper Kurzii, Ridl. Batu Caves (Ridley). An erect shrub of Burma; in the Peninsula rare, Upper Perak and Kelantan.

Piper Maingayi, Hook. fl. Dusun Tua (Ridley). A climbing shrub, endemic, not common in forest, Klang, Malacca, Singapore.

Piper malaccense, C. DC. Sungai Buloh (Ridley). An erect small shrub, endemic, not common in forest, Malacca and Johore.

Piper miniatum, Bl. Seminyih (Hume). A climbing shrub of Java; in the Peninsula common in forest from Langkawi to Singapore.

Piper muricatum, Bl. K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A shrubby herb of W. Malaysia; in the Peninsula common in forest from Upper Perak to Johore.

Piper pachyphyllum, Hook. fl. Ulu Gombak (Ridley). A climbing shrub, endemic, common in forest but seldom flowering.

Piper pedicellæsum, Wall. Public Gardens, K. Lumpur, (Forest Dept.). A climbing pepper of Assam and Tenasserim; in the Peninsula Upper Perak to Singapore in forest.

Piper porphyrophyllum, N. E. Br. Batu Caves; Klang Gates; Petaling; Seminyih; Ulu Gombak; Weld's Hill. A slender climber of Borneo; in the Peninsula common in forest, but seldom flowering.

Piper ramipilum, C. DC. Ulu Gombak (Hume). A creeping shrub, endemic, Penang and Upper Perak to Singapore, in forest.

Piper ribesioides, *Wall.* ?Klang Gates; Rawang; ?Seminyih. A creeping shrub of Tenasserim and Sumatra; in the Peninsula common in forest from Langkawi to Singapore.

Piper Ridleyi, *C. DC.* Ulu Gombak (Hume). A shrub, endemic, usually montane, Upper Perak to Singapore.

Piper stylosum, *Miq.* Batang Berjuntai; Batu Caves; Bukit Raja; Kajang; Klang Gates; K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. An erect small shrub of Sumatra and Borneo; in the Peninsula common in forest from Upper Perak and Kelantan to North Johore.

Piper subpenninerve, *Ridl.* Batu Caves (Curtis). A climber of Tenasserim; in the Peninsula rare in forest, Perak and the Dindings.

Piper umbellatum, *Linn.* Batu Caves; Ulu Gombak. A pantropic shrub, common in the Peninsula in forest.

CULTIVATED PIPERACEÆ.

Piper Betle, *Linn.* Batu Caves; K. Lumpur; Ulu Gombak. A climbing shrub, extensively cultivated in S. E. Asia.

Piper nigrum, *Linn.* (Black Pepper). A native of South India, not wild in the Peninsula.

CHLORANTHACEÆ.

Chloranthus officinalis, *Bl.* Batu Caves; Ulu Gombak. A small shrub of Indo-Malaya to the Philippines and New Guinea, and China; in the Peninsula common in forest from Langkawi to Singapore.

MYRISTICACEÆ.

Horsfieldia amygdalina, *Warb.* Sungai Buloh (Forest Dept.). A small tree of India, Burma and Tenasserim; in the Peninsula rare in forest, Penang Hill and Singapore.

Horsfieldia Lehmanniana, *Warb.* Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, Perak to Singapore in forest.

Horsfieldia majuscula, *Warb.* Klang Gates; Rawang. A tree of Lower Siam; in the Peninsula Penang to Singapore in forest.

Horsfieldia subglobosa, *Warb.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Sumatra; in the Peninsula not common in forest, Perak, Malacca, Johore.

Horsfieldia superba, *Warb.* Ulu Gombak; Weld's Hill. A tall tree, endemic, Penang to Singapore, in forest.

Horsfieldia tomentosa, *Warb.* Weld's Hill (Forest Dept.). A small tree of Borneo; in the Peninsula not uncommon in forest from Penang to Singapore.

Horsfieldia Wallichii, *Warb.* Public Gardens, K. Lumpur; Rantau Panjang. A tree, endemic, not common in forest, Province Wellesley, Negri Sembilan, Singapore.

Gymnacranthera Farquhariana, *Warb.* Batu Tiga (Curtis). A tree, endemic, common in forest from Penang to Singapore.

Gymnacranthera Forbesii, *Warb.* Klang Gates; K. Lumpur; Ulu Gombak. A tree of Sumatra; in the Peninsula common in the lowlands from Penang to Singapore.

Myristica crassa, *King.* Sungai Buloh; Weld's Hill. A tree, endemic, Taiping to Singapore in forest.

Myristica cinnamomea, *King.* Kanching; Sungai Buloh; Ulu Gombak. A tree, endemic and common in forest.

Myristica elliptica, *Wall.* Sungai Buloh; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula common in forest.

Myristica ?maxima, *Warb.* Weld's Hill (Forest Dept. 1802).

Knema Cantleyi, *Warb.* Klang Gates; Sungai Buloh; Weld's Hill. A tree, endemic, not common in forest, Penang, Perak, Selangor, Singapore.

Knema conferta, *Warb.* Weld's Hill (Forest Dept.). A small tree of Tenasserim, Siam and Borneo; in the Peninsula common in forest from Penang to Singapore.

Knema ?Curtisii, *Warb.* Batu Caves (Forest Dept. 6445).

Knema furfuracea, *Warb.* Weld's Hill; Klang Gates. A small tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Knema Hookeriana, *Warb.* Bukit Raja; Klang Gates. A small tree of Sumatra and Borneo; in the Peninsula common in the lowlands from Langkawi to Singapore.

Knema Kunstleri, *Warb.* K. Lumpur; Ulu Gombak. A small tree, endemic, Taiping to Malacca, in forest.

Knema laurina, *Warb.* K. Lumpur; Seminyih; Ulu Gombak. A tree of W. Malaysia; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Knema malayana, *Warb.* Klang Gates; K. Lumpur. A tree of Burma and Tenasserim; in the Peninsula common in forest from Penang to Singapore.

Knema missionis, *Warb.* K. Lumpur; Ulu Gombak. A tree of Burma, Tenasserim and Borneo; in the Peninsula common in forest from Setul to Singapore.

Knema oblongifolia, *Warb.* Weld's Hill (Forest Dept.). A shrub or small tree, endemic, Penang to Singapore, in forest.

Knema Wrayi, *Warb.* K. Lumpur; Ulu Gombak. A small tree, endemic, Taiping to Singapore, in forest.

CULTIVATED MYRISTICACEÆ.

Myristica fragrans, *Linn.* (The Nutmeg). Public Gardens, K. Lumpur (Forest Dept.). A tree, native of the Moluccas, cultivated occasionally in the Peninsula.

MONIMIACEÆ.

Matthaea sancta, *Bl.* Klang Gates (Ridley). A shrub or small tree of Borneo; in the Peninsula Taiping Hills to Singapore, in forest.

Kibara chartacea, *Bl.* Seminyih; Ulu Gombak. A shrub of Sumatra; in the Peninsula Penang to Malacca, in forest.

Kibara coriacea, *Tul.* K. Lumpur (Forest Dept.). A small tree of Java; in the Peninsula rare in forest, Penang and Perak.

LAURACEÆ.

Cryptocarya areolata, *Gamble.* Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Perak and Ulu Selangor.

Cryptocarya crassinervia, *Miq.* Sungai Buloh (Forest Dept., fide Ridley). A tree of Sumatra and Borneo; in the Peninsula not common in forest, Perak and the Dindings.

Cryptocarya ?ferrea, *Bl.* Seminyih (Hume 7901).

Cryptocarya Griffithiana, *Wight.* K. Lumpur; Sungai Buloh. A tall tree of Tenasserim, Sumatra and Borneo; in the Peninsula common in forest from Perak to Singapore.

Cryptocarya tenuifolia, *Ridl.* Ulu Gombak (Ridley). A tree, endemic and local.

Beilschmiedia longipedicellata, *Ridl., Kew Bull., 10, 1926, p. 475.* Seminyih (Hume 8432). A small tree, endemic and local.

Beilschmiedia Maingayi, *Hook. fil.* Ulu Gombak (Hume 9267). A tree, endemic, not common in forest, Perak, the Dindings, Malacca.

Beilschmiedia perakensis, *Gamble.* Weld's Hill (Forest Dept.). A shrub or tree, endemic, not common in forest, Perak.

Dehaasia cuneata, *Bl.* K. Lumpur; Ulu Gombak. A tree of Burma, Sumatra and Java; in the Peninsula, Adang Islands, Perak and the Dindings, in forest.

Dehaasia Curtisii, *Gamble*. Batu Caves (Kelsall). A small tree, endemic and rare, Penang.

Dehaasia elliptica, *Ridl*. Bukit Cheraka Forest Reserve (Forest Dept. 3462); Public Gardens, K. Lumpur (Forest Dept. 2456, 4760, 4884, 4914); Ulu Gombak (Hume 9306). A tree, endemic and local

Dehaasia microcarpa, *Bl*. Ulu Gombak (Forest Dept.). A small tree of Sumatra, Java and Borneo; in the Peninsula common in forest.

Dehaasia nigrescens, *Gamble*. Klang Gates (Ridley). A small tree, endemic, not common in forest, Penang and Singapore.

Endiandra Maingayi, *Hook. fil*. Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, Perak and Malacca, in forest.

Endiandra praeclara, *Gamble*. Sungai Buloh (Forest Dept.). A tree, endemic, not common in forest, Penang and Perak.

Cinnamomum iners, *Reinw*. K. Lumpur. A small tree of Indo-Malaya to the Philippines; in the Peninsula common in open places.

Cinnamomum mollissimum, *Ridl*. Weld's Hill (Forest Dept.). A shrub or small tree, endemic, Penang to Negri Sembilan, in forest.

Cinnamomum paraneuron, *Miq*. Weld's Hill (Forest Dept.). A tree of Sumatra; in the Peninsula apparently not uncommon.

Alseodaphne peduncularis, *Hook. fil*. K. Lumpur; Petaling; Rantau Panjang; Sungai Buloh. A shrub or small tree, endemic, common in forest.

Alseodaphne Ridleyi, *Gamble*. Weld's Hill (Forest Dept.). A tree, endemic and rare in forest, Semangkok Pass.

Nothaphoebe umbelliflora, *Bl*. Sungai Buloh; Weld's Hill. A tree of Siam to Borneo; in the Peninsula common in forest from Penang to Singapore.

Phoebe cuneata, *Bl*. Weld's Hill (Forest Dept.). A tree of Java; in the Peninsula Penang to Singapore, in forest.

Phoebe macrophylla, *Bl*. Ampang; Ulu Gombak. A small tree of Java; in the Peninsula not common in forest, Perak, the Dindings and Singapore.

Phoebe opaca, *Bl*. Kepong; Sungai Buloh; Weld's Hill. A tree of W. Malaysia; in the Peninsula not uncommon in forest from Penang to Singapore.

Actinodaphne Maingayi, *Hook. fil.*, var. *elliptica*, *Gamble* Damansara Road, K. Lumpur (Ridley). A tree of ?Borneo; in the Peninsula Perak to Singapore in forest.

Actinodaphne sesquipedalis, *Hook. fil.* Weld's Hill (Forest Dept.). A tree of Tenasserim, Lower Siam and Borneo; in the Peninsula Penang, Perak and Pahang, in forest.

Litsea amara, *Bl.* Kepong; Klang Gates (var. *fuscotomentosa*, *Meissn.*); Petaling; Seminyih; Sungai Buloh (var. *angusta*, *Meissn.*); Ulu Gombak; Weld's Hill (var. *attenuata*, *Gamble*, and var. *angusta*, *Meissn.*). A shrub or small tree of Indo-Malaya; in the Peninsula common in forest and open country from Langkawi to Singapore.

Litsea angulata, *Bl.* Batu Caves (Ridley). A tree of Java; in the Peninsula rare in forest, Taiping Hills.

Litsea castanea, *Hook. fil.* K. Lumpur; Rantau Panjang. A tall tree, endemic, Taiping to Malacca, in forest.

Litsea citrata, *Bl.* Ulu Gombak (Hume). A small tree of Indo-Malaya and China; in the Peninsula in clearings in hill forest, Perak, Pahang and Selangor.

Litsea firma, *Hook. fil.* K. Lumpur; Sungai Buloh. A tree of Sumatra, Borneo and Celebes; in the Peninsula common in forest from Taiping to Singapore.

Litsea grandis, *Hook. fil.* K. Lumpur (Forest Dept.). A tree of Burma and Java; in the Peninsula common in open country.

Litsea Griffithii, *Gamble*. Batang Berjuntai; Weld's Hill. A tree of Sumatra; in the Peninsula common in forest from Taiping to Singapore.

Litsea johorensis, *Gamble*. Seminyih (Hume). A tree, endemic, not common in forest, Pahang, Negri Sembilan, Johore.

Litsea lancifolia, *Hook. fil.* K. Lumpur (Curtis). A bush or small tree of Indo-Malaya and China; in the Peninsula Perak to Singapore, in forest.

Litsea machilifolia, *Gamble*. Batang Berjuntai; Rantau Panjang. A tree, endemic in lowland forest from Penang to Singapore.

Litsea magnifica, *Gamble*. Weld's Hill (Forest Dept.). A small tree of Sumatra; in the Peninsula not very common in forest, Penang, Pahang, Malacca.

Litsea megacarpa, *Gamble*. Dusun Tua; Klang Gates; Rantau Panjang. A tree, endemic, Province Wellesley to Singapore, in forest.

Litsea monticola, *Gamble*. Sungai Buloh (Forest Dept. 1585). A tree, endemic and rare in forest, Taiping Hills.

Litsea nidularis, *Gamble*. Weld's Hill (Forest Dept.). A tall tree, endemic, not common in forest, Penang, Perak, Pahang.

Litsea Noronhae, *Bl.* Batu Caves (Ridley). A shrub or tree of Sumatra and Java; in the Peninsula not common in forest, Taiping to Selangor.

Litsea panamonja, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Assam, Burma and Lower Siam; in the Peninsula rare, Perak, Selangor and Malacca.

Litsea penangiana, *Hook. fil.* Weld's Hill (Forest Dept.). A small tree, endemic, usually in hill forest, Penang Hill, Gunong Batu Puteh, Fraser Hill.

Litsea perakensis, *Gamble*. Sungai Buloh; Weld's Hill. A tree, endemic, Perak, Johore, Singapore, in forest.

Litsea petiolata, *Hook. fil.* Weld's Hill (Forest Dept.). A tall tree, endemic in the lowlands from Perak to Singapore.

Litsea robusta, *Bl.* Batu Caves; Sungai Buloh. A tall tree of Burma and Java; in the Peninsula not common in forest, Perak and Singapore.

Litsea spathacea, *Gamble*. K. Lumpur; Seminyih; Ulu Gombak. A shrub or small tree, endemic, Penang to Negri Sembilan, in forest.

Litsea tomentosa, *Bl.* Weld's Hill (Forest Dept.). A tree of Java; in the Peninsula not common in forest, Penang, Perak and N. Johore.

Litsea ujongensis, *Gamble*. Seminyih (Hume). A shrub or small tree, endemic, not common in forest, Perak, Negri Sembilan, Mt. Ophir.

Neolitsea zeylanica, *Merr.* Weld's Hill (Forest Dept.). A shrub or small tree of Indo-Australia; in the Peninsula common in open country.

Lindera malaccensis, *Hook. fil.* K. Lumpur (Ridley). A tree of Sumatra and Borneo; in the Peninsula common in the lowlands from Perak to Singapore.

Lindera pipericarpa, *Boerl.* Ulu Gombak (Hume 9192, 9718). A tree, endemic, not common in montane forest, Perak and Pahang.

CULTIVATED LAURACEÆ.

Cinnamomum zeylanicum, *Nees*. (Cinnamon). Public Gardens, K. Lumpur (Forest Dept.). A small tree of India and Ceylon; in the Peninsula cultivated only.

Persea gratissima, *Gaertn.* (Avocado Pear). K. Lumpur, (Agri. Dept.). A tree of Trop America; in the Peninsula occasionally cultivated.

HERNANDIACEÆ.

Illigera appendiculata, *Bl.* Batu Caves (Ridley). A climbing shrub of India, Burma and Java; in the Peninsula common in forest.

Hernandia peltata, *Meissn.* Public Gardens, K. Lumpur (Forest Dept.), probably planted here. A tall tree of E. Africa to Polynesia; in the Peninsula not very common, usually on seashores.

PROTEACEÆ.

Helicia attenuata, *Bl.* Dusun Tua; Klang Gates; K. Lumpur; Ulu Gombak. A shrub or tree of Java; in the Peninsula common in forest from Penang to Johore.

Helicia petiolaris, *Benn.* K. Lumpur (Goodenough). A tree, endemic, Penang (cult.) to Singapore, in forest.

Helicia robusta, *Wall.* K. Lumpur (Ridley). A tree of India, Burma, Sumatra and Java; in the Peninsula common in forest in the south.

THYMELACEÆ.

Wikstroemia viridiflora, *Meissn.* Batu Caves (Ridley). A small shrub of India, Burma China and the Philippines; in the Peninsula not common, Langkawi and Penang.

Aquilaria malaccensis, *Lamk.* Weld's Hill (Forest Dept.). A tall tree of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

LORANTHACEÆ.

Loranthus ferrugineus, *Roxb.* K. Lumpur; Ulu Gombak. A parasitic bush of W. Malaysia to the Philippines; in the Peninsula very common.

Loranthus grandifrons, *King.* K. Lumpur (Ridley). A parasitic shrub of Lower Siam and Sumatra; in the Peninsula common in open places from Taiping to Malacca and in Pahang.

Loranthus heteranthus, *Wall.* K. Lumpur. A big parasitic shrub of Indo-Malaya; in the Peninsula Kedah to N Johore in forest.

Loranthus pentandrus, *Linn.* Ulu Gombak (Hume). A large parasitic shrub of India to S. China, and W. Malaysia to the Philippines; in the Peninsula common.

Loxanthera speciosa, *Bl. & Fisch.* Rantau Panjang (Hume). A parasitic shrub of W. Malaysia; in the Peninsula not common, Perak, Malacca, Johore.

Elytranthe Barnesii, *Gamble.* K. Lumpur, parasitic on *Durio zibethinus*, (Sands 32). A parasitic shrub, endemic and very rare, hitherto known only from Gunong Benom (Pahang).

Elytranthe globosa, *Don.* K. Lumpur (Forest Dept.). A parasitic shrub of Indo-Malaya to the Philippines; in the Peninsula common from Perlis to Singapore.

Elytranthe platyphylla, *Gamble.* Ulu Gombak (Hume). A large parasitic bush, endemic, not common, Upper Perak to N. Johore.

SANTALACEÆ.

Henslowia umbellata, *Bl.* Ulu Gombak (Hume). A climbing parasitic shrub of W. Malaysia; in the Peninsula common, often near the sea.

OPILIACEÆ.

Champerea Griffithii, *Hook. fil.* Klang Gates; Sungai Buloh; Weld's Hill. A shrub of Indo-Malaya to Formosa; in the Peninsula common in forest and open country from Langkawi to Singapore.

Lepionurus sylvestris, *Bl.* Klang Gates; Seminyih; Ulu Gombak; Weld's Hill. A small shrub of Siam, Java and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

BALANOPHORACEÆ.

Balanophora multibrachiata, *Fawcett.* Ulu Gombak (Hume). A parasite of Sumatra; in the Peninsula Perak, Negri Sembilan, N. Johore, in forest.

EUPHORBIACEÆ.

Euphorbia hirta, *Linn.* K. Lumpur; Rantau Panjang; Salak; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula common in waste ground.

Euphorbia synadenium, *Ridl.* Seminyih (Hume). A shrub, endemic, not common, Penang, Upper Perak, Selangor, Malacca.

Bridelia pustulata, *Hook. fil.* K. Lumpur (Ridley). A tree, endemic, Penang to Singapore in forest.

Bridelia tomentosa, *Bl.* Batu Caves; Klang Gates; K. Lumpur. A small tree of Indo-Australia; in the Peninsula common in open places and secondary growth from Langkawi to Singapore.

Cleistanthus hirsutulus, *Hook. fil.* Batu Caves (Burkill). A small tree of Lower Siam; in the Peninsula Perak to Singapore in forest.

Cleistanthus membranaceus, *Hook. fil.* Batu Caves (Forest Dept.). A tree, endemic, not common in forest, Penang and Taiping.

Actephila excelsa, *Muell. Arg.* Batu Caves (Ridley, Curtis). A small shrub of India, Assam, Burma, Tenasserim, Java; in the Peninsula often near limestone, Penang, Perak, Singapore.

Actephila javanica, *Miq.* Batu Caves (Ridley). A small shrub of Tenasserim, Lower Siam, Java and Borneo; in the Peninsula widespread in forest, commonest in the north.

Andrachne calcarea, *Ridl.* Batu Caves (Ridley). A small shrublet of Siam; in the Peninsula rare on limestone, Langkawi.

Phyllanthus dalbergioides, *Wall.* Batu Caves; Ulu Gombak. A small shrub of Burma; in the Peninsula not common in forest, Langkawi, Perak.

Phyllanthus erythrocarpus, *Ridl.* Batu Caves (Ridley). A tree, endemic and local.

Phyllanthus frondosus, *Wall.* Batu Caves; K. Lumpur; Rantau Panjang; Ulu Gombak. A shrub of Siam, Lingga and the Carimon Is.; in the Peninsula common in forest from Kedah to Johore.

Phyllanthus gomphocarpus, *Hook. fil.* Petaling; Sungai Buloh. A shrub of Siam; in the Peninsula Langkawi to Mt. Ophir in forest.

Phyllanthus Niruri, *Linn.* Batang Berjuntai; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula common in waste ground.

Phyllanthus pulcher, *Wall.* Klang Gates; Ulu Gombak. A small shrub of Siam and Java; in the Peninsula on riverbanks and escaping from cultivation.

Phyllanthus urinaria, *Linn.* Dusun Tua; K. Lumpur; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula a common weed.

Glochidion desmocarpum, *Hook. fil.* K. Lumpur (Ridley). A small tree, endemic, Penang to Singapore.

Glochidion glomerulatum, *Boerl.* K. Lumpur; Rawang. A tree of Sumatra and Java; in the Peninsula rare in forest, Penang, Perak and Malacca.

Glochidion Kunstlerianum, *Gage.* K. Lumpur (Curtis). A shrub, endemic, not common in forest, Perak, Johore, Singapore.

Glochidion lævigatum, *Hook. fil.* K. Lumpur; Sungai Buloh (var. *cuspidatum*, *Ridl.*); A tree of Tenasserim; in the Peninsula the species common in open country, the var. at Taiping and Klang.

Glochidion leiostylum, *Kurz.* K. Lumpur; Ulu Gombak. A tree of Burma, Siam and Borneo; in the Peninsula Langkawi to Singapore, in open places.

Glochidion microbotrys, *Hook. fil.* Weld's Hill (Forest Dept.). A tree of Lower Siam; in the Peninsula not common, Taiping and Singapore.

Glochidion nanogynum, *Hook. fil.* Batu Caves; (Ridley). A shrub or tree, endemic, Penang, Perak, Malacca.

Glochidion obscurum, *Bl.* Ampang; K. Lumpur. A shrub or tree of Siam, Sumatra, Java and China; in the Peninsula common in the north.

Glochidion rubrum, *Bl.* K. Lumpur (Forest Dept.). A shrub of Lower Siam, Java and the Philippines; in the Peninsula Langkawi, Province Wellesley, Pahang, Johore.

Glochidion sericeum, *Hook. fil.* Ayer Hitam; Batu Caves; K. Lumpur; Petaling; Sungai Buloh; Ulu Gombak. A small tree of W. Malaysia; in the Peninsula common south of Taiping in open places and secondary growth.

Glochidion superbum, *Baill.* Klang Gates; K. Lumpur; Sungai Buloh. A small tree of W. Malaysia to the Philippines; in the Peninsula common in secondary growth.

Glochidion tetrapteron, *Gage.* Ulu Gombak (Hume). A shrub or tree, endemic and rare in forest, Semangkok Pass.

Glochidion trilobum, *Ridl.* Seminyih (Hume). A tree, endemic, not common in forest, Perak, Negri Sembilan, Singapore.

Glochidion Wallichianum, *Muell. Arg.* Ampang; K. Lumpur, Public Gardens and Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Penang, Pahang and Malacca.

Breynia angustifolia, *Hook. fil.* Ulu Gombak (Hume). A shrub of Siam; in the Peninsula Taiping to Selangor in forest.

Breynia coronata, *Hook. fil.* Rantau Panjang; Ulu Gombak. A small tree, endemic, common in forest from Langkawi to Johore.

Breynia discigera, *Muell. Arg.* Klang Gates; Ulu Gombak. A shrub or small tree of Siam; in the Peninsula not uncommon in forest and secondary growth from Penang to Taiping.

Breynia reclinata, *Hook. fil.* Ampang (Forest Dept.). A shrub of Sumatra and Java; in the Peninsula common in secondary growth and open places.

Breynia rhamnoides, *Muell. Arg.* Rantau Panjang; Ulu Gombak. A small tree of Indo-Malaya to the Philippines; and China; in the Peninsula Penang and Upper Perak to Singapore in open places and secondary growth.

Sauropus albicans, *Bl.* Petaling; Ulu Gombak. A shrub of Indo-Malaya to the Philippines; in the Peninsula in waste ground and gardens.

Sauropus elegantissimus, *Ridl.*, *Kew Bull.* 10, 1926, p. 476. Ulu Gombak (Hume 9366). A small tree, endemic and local.

Sauropus spectabilis, *Miq.* Batu Caves (Ridley, Burkill). A shrub of Assam and Sumatra; in the Peninsula rare, known only from this locality.

Sauropus sumatranus, *Miq.* Klang Gates (Ridley). A shrub of Sumatra; in the Peninsula rare, known only from this locality.

Drypetes longifolia, *Pax.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya to the Philippines; in the Peninsula not common in forest, Malacca.

Drypetes pendula, *Ridl.* Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, Penang, Taiping, Singapore, in forest.

Longetia malayana, *Pax.* Klang Gates (all collectors). A tree of Borneo; in the Peninsula Kedah to Singapore in dry open places.

Antidesma alatum, *Hook. fil.* Ulu Gombak (Hume). A small tree of Lower Siam; in the Peninsula common in forest from Taiping to Singapore.

Antidesma coriaceum, *Tulasne.* Batu Caves; Ulu Gombak. A small tree of Lower Siam and Borneo; in the Peninsula common in forest from Penang to Singapore.

Antidesma cuspidatum, *Muell. Arg.* Batang Berjuntai; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree of Borneo; in the Peninsula common in forest from Perlis to Singapore.

Antidesma fusiforme, *Gage.* Batu Caves; K. Lumpur. A ?shrub, endemic, Penang, ?Perak, Dindings, Johore.

Antidesma Ghæsembilla, *Gaertn.* Batang Berjuntai (Hume). A bush or small tree of Indo-Australia and China; in the Peninsula Setul to Malacca in open country.

Antidesma montanum, *Bl.* Batang Berjuntai; Sungai Buloh; Ulu Gombak. A small tree of Indo-Malaya; in the Peninsula common in lowland forest.

Antidesma salicinum, *Ridl.* Klang Gates (Forest Dept.). A shrub of Borneo; in the Peninsula on riverbanks from Upper Perak and Kelantan to Johore.

Antidesma stipulare, *Bl.* Ulu Gombak (Hume, Ridley). A shrub or small tree of Java, Borneo and Amboina; in the Peninsula not common in forest, Perak and Johore.

Antidesma tomentosum, *Bl.* Seminyih (Hume 8192). A shrub or small tree of W. Malaysia; in the Peninsula Upper Perak to Johore in forest.

Antidesma velutinosum, *Bl.* Batu Caves; K. Lumpur. A small tree of Burma Siam, Sumatra and Java; in the Peninsula very common in forest from Langkawi to Singapore.

Daphniphyllum bancanum, *Kurz.* K. Lumpur (Ridley). A tree of Bangka; in the Peninsula not common in open places, Setul, Perak, Pahang, Negri Sembilan.

Daphniphyllum laurinum, *Baill.* K. Lumpur; Sungai Buloh. A shrub of Siam and W. Malaysia; in the Peninsula common in open places and on the seashore from Setul to Singapore.

Aporosa aurea, *Hook. fil.* Weld's Hill (Forest Dept.). A bush or tree of Burma and Tenasserim; in the Peninsula common in forest from Langkawi to Johore.

Aporosa Benthamiana, *Hook. fil.* Klang Gates; Weld's Hill. A tree, endemic, Penang to Singapore, in forest.

Aporosa frutescens, *Bl.* Kuang (Ridley). A shrub or small tree of Sumatra and Java; in the Peninsula common in forest from Langkawi to Singapore.

Aporosa Maingayi, *Hook. fil.* K. Lumpur; Petaling; Sungai Buloh. A small tree, endemic, Kedah to Singapore, in forest.

Aporosa Miqueliana, *Muell. Arg.* Weld's Hill (Forest Dept.). A shrub or small tree of Lower Siam, Sumatra and Borneo; in the Peninsula Taiping to Johore in forest.

Aporosa ?nervosa, *Hook. fil.* Weld's Hill (Forest Dept. 828).

Aporosa Prainiana, *King.* Ayer Hitam; Bukit Tunggal; K. Lumpur. A small tree, endemic and common from Penang to Singapore.

Aporosa stellifera, *Hook. fil.* K. Lumpur; Sungai Buloh; Ulu Gombak. A small tree, endemic, Penang and Upper Perak to S. Pahang, in forest.

Aporosa symplocoides, *Gage.* Sungai Buloh; Weld's Hill. A tree, endemic, Penang to Singapore, in forest.

Baccaurea brevipes, *Hook. fil.* Dusun Tua; Klang Gates; Sungai Buloh; Ulu Gombak; Weld's Hill. A small tree of Borneo; in the Peninsula common from Kedah to Malacca in forest.

Baccaurea Griffithii, *Hook. fil.* Weld's Hill (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Baccaurea Kingii, *Gage.* Kanching; Sungai Buloh. A tree, endemic, Penang to Singapore, in forest.

Baccaurea Kunstleri, *Gage.* Weld's Hill (Forest Dept.). A tree, endemic, not common in forest, Perak and Singapore.

Baccaurea lanceolata, *Muell. Arg.* Batu Caves; Sungai Buloh. A tree of W. Malaysia to the Philippines; in the Peninsula Penang and Upper Perak to Singapore, in forest.

Baccaurea malayana, *King.* Sungai Buloh; Weld's Hill. A tree, endemic, Perak, Pahang, Malacca, in forest, and cultivated.

Baccaurea parviflora, *Muell. Arg.* K. Lumpur (Curtis). A small tree of Burma, Siam, Sumatra and Borneo; in the Peninsula common from Kedah to Singapore in forest.

Baccaurea ?polyneura, *Hook. fil.* Weld's Hill (Forest Dept., tree 362).

Baccaurea Wallichii, *Hook. fil.* Batu Tiga (Ridley). A tree of Borneo; in the Peninsula common from Penang to Singapore in forest.

Baccaurea Wrayi, *King.* Ulu Gombak (Hume). A tree, endemic, not common, Adang Islands, Penang, Perak, Pahang, in forest.

Elateriospermum Tapos, *Bl.* Batu Caves; Weld's Hill. A tall tree of W. Malaysia; in the Peninsula Penang to Malacca in forest.

Galearia affinis, *Br.* Batu Caves; Dusun Tua; Rantau Panjang; Sungai Buloh; Weld's Hill. A small tree of ?Siam; in the Peninsula common in forest.

Galearia fusca, *Ridl.* Seminyih (Hume). A shrub, endemic, not common, Negri Sembilan and Johore.

Galearia lancifolia, *Ridl., Kew Bull., 10, 1926, p. 476.* Klang Gates (Hume 7146); Ulu Gombak (Hume 9931). A small tree, endemic and local in forest.

Galearia minor, *Gage.* Seminyih (Hume). A small tree of Sumatra; in the Peninsula not common in forest, Perak, Pahang, Negri Sembilan.

Galearia Ridleyi, *Gage.* Dusun Tua (Ridley). A shrub, endemic, not common, Johore.

Microdesmis casearifolia, *Planch.* Kepong; Klang Gates; K. Lumpur. A small tree of Indo-Malaya to the Philippines; in the Peninsula common in forest from Perlis to Singapore.

Croton calcicolum, *Ridl.* Kanching, on limestone (Ridley). A shrub of Borneo; in the Peninsula known only from this locality.

Croton caudatum, *Geisel* var. *malaccanum*, *Hook. fil.* K. Lumpur (Ridley, Forest Dept.). A shrub, the species of Indo-Malaya to the Philippines, the var. from Tenasserim; in the Peninsula common, especially in open country.

Croton erythrostachys, *Hook. fil.* Kanching; Rawang. A shrub, endemic, usually montane, Perak, Klang, Negri Sembilan, Mt. Ophir, Johore.

Croton Griffithii, *Hook. fl.* Batu Caves; Klang Gates; K. Lumpur; Rawang; Seminyih; Sungai Buloh; Ulu Gombak. A shrub or tree, endemic and common in forest from Penang to Singapore.

Trigonostemon salicifolius, *Ridl.* Kanching, on limestone; Ulu Gombak. A small shrub, endemic and local.

Trigonostemon villosus, *Hook. fl.* K. Lumpur; Sungai Buloh; Ulu Gombak. A small shrub, endemic, not common in forest, Perak, Mt. Ophir, Johore.

Agrostistachys Gaudichaudii, *Muell. Arg.* Batu Caves (Ridley). A tree, endemic and common in forest from Langkawi to Singapore.

Claoxylon indicum, *Hassk.* Batu Caves; Ulu Gombak. A shrub of Indo-Malaya; in the Peninsula common in forest from Perlis to Singapore.

Claoxylon longifolium, *Muell. Arg.* Seminyih (Hume). A shrub or small tree of Sumatra and Java; in the Peninsula common in forest from Langkawi to Singapore.

Epiprinus malayanus, *Griff.* Dusun Tua; Klang Gates; Sungai Besi; Weld's Hill. A shrub of Sumatra; in the Peninsula Kedah to Malacca, in forest.

Cœlodiscus subcuneatus, *Gage.* Dusun Tua (Ridley). A small tree, endemic, not common in forest, Langkawi, Kedah, Perak.

Melanolepis multiglandulosa, *Rchb.* K. Lumpur (Ridley). A small tree of Malaysia and Indo-China; in the Peninsula not common in forest, Kelantan, Perak, Pahang.

Mallotus cochinchinensis, *Lour.* Batang Berjuntai; K. Lumpur; Petaling; Rantau Panjang; Rawang; Serdang; Ulu Gombak. A small tree of Indo-Malaya and China; in the Peninsula common in forest and secondary growth from Penang to Singapore.

Mallotus dispar, *Muell. Arg.* Batu Caves, common here (Ridley). A shrub or small tree of W. Malaysia; in the Peninsula usually on limestone, Kedah, Perak, Pahang, Pulau Tioman.

Mallotus Griffithianus, *Hook. fl.* K. Lumpur; Rantau Panjang; Sungai Buloh. A shrub, endemic, Langkawi, Perak, Pahang, Dindings, Malacca, in forest.

Mallotus Kingii, *Hook. fl.* Batu Caves; K. Lumpur. A tree, endemic and rare in forest, Perak.

Mallotus macrostachyus, *Muell. Arg.* Klang Gates; K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A shrub or small tree of Siam to Borneo; in the Peninsula common in open places and secondary growth from Langkawi and Kelantan to Singapore.

Mallotus Porterianus, *Muell. Arg.* Batu Caves; K. Lumpur. A small tree of ?Siam and Sumatra; in the Peninsula common in forest and secondary growth from Penang to Johore.

Mallotus repandus, *Muell. Arg.* Batu Caves (Ridley). A climbing shrub of Indo-Australia; in the Peninsula Perlis to Negri Sembilan in forest.

Mallotus subpeltatus, *Muell. Arg.* Batu Caves; K. Lumpur; Sungai Buloh. A small tree of Sumatra and Java; in the Peninsula Langkawi to Malacca and N. Johore, in forest.

Ptychopyxis costata, *Miq.* Weld's Hill (Forest Dept.). A small tree of Sumatra; in the Peninsula not very common in forest, Taiping Hills, Malacca, Singapore.

Macaranga denticulata, *Muell. Arg.* Rawang (Ridley). A tree of Indo-Malaya; in the Peninsula Perlis to the Pahang river in open forest.

Macaranga Griffithiana, *Muell. Arg.* Ampang (Forest Dept.). A small tree, endemic, not common, Penang to Singapore.

Macaranga Hosei, *King.* Ulu Gombak (Hume). A tree of Borneo; in the Peninsula not very common in forest, Trengganu, Perak, Malacca.

Macaranga Hullettii, *King.* Bukit Raja; Batu Tiga; Klang Gates; K. Lumpur; Rawang; Ulu Gombak. A small tree, endemic, Taiping to Malacca, in open places.

Macaranga hypoleuca, *Muell. Arg.* Klang Gates; K. Lumpur; Sungai Buloh; Ulu Gombak. A tree of Sumatra and Borneo; in the Peninsula common in secondary growth.

Macaranga incisa, *Gage.* K. Lumpur (Ridley). A tree, endemic and local.

Macaranga Kingii, *Hook. fil.* K. Lumpur (Forest Dept.). A small tree, endemic and rare, Johore.

Macaranga megalophylla, *Muell. Arg.* Klang Gates; Sungai Buloh; Weld's Hill. A tree of Sumatra and Borneo; in the Peninsula common from Penang to Johore in open swampy places.

Macaranga populifolia, *Muell. Arg.* K. Lumpur (Forest Dept.). A tree of Tenasserim; Sumatra and Borneo; in the Peninsula Penang to Singapore, in secondary growth.

Macaranga quadricornis, *Ridl.* Seminyih (Hume). A small tree, endemic and rare, Semangkok Pass and Klang.

Macaranga robiginosa, *Ridl.* K. Lumpur; Ulu Gombak, and doubtless in other localities. A small tree, endemic and common from Penang to Singapore, especially in secondary growth.

Macaranga tanaria, *Muell. Arg.* Batu Caves; Ulu Gombak. A small tree of Tenasserim to Australia, and China; in the Peninsula common north of Malacca, in open places.

Macaranga triloba, *Muell. Arg.* Bukit Raja; Ulu Gombak; Weld's Hill. A tree of Tenasserim to the Philippines; in the Peninsula common in secondary growth and open places.

Endospermum malaccense, *Muell. Arg.* Bukit Raja; K. Lumpur. A tall tree, endemic, Penang to Singapore common in forest.

Pimeleodendron Griffithianum, *Benth.* Klang Gates; K. Lumpur; Petaling. A tree, endemic, not common in forest, Penang to Singapore.

Homalanthus populifolius, *Grah.* Batu Caves (Ridley). A small tree of W. Malaysia and Australia; in the Peninsula common in the north and near limestone.

Sapium baccatum, *Roxb.* K. Lumpur; Petaling; Rantau Panjang. A tree of India and Sumatra; in the Peninsula Penang to Johore, in forest.

Sapium discolor, *Muell. Arg.* K. Lumpur (Ridley). A tree of Borneo and China; in the Peninsula not common in forest and secondary growth, Perak, Malacca and Singapore.

CULTIVATED EUPHORBIACEÆ.

Acalypha macrophylla, *H. B. K.* Common in gardens. A shrub of Polynesia, often cultivated in the Peninsula.

Aleurites moluccana, *Willd.* (Candle-nut). Ampang; Pudu, probably planted. A tree of Indo-Malaya and the Pacific Islands; in the Peninsula on seacoasts and often planted.

Baccaurea Motleyana, *Muell. Arg.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Sumatra and Borneo; in the Peninsula cultivated and apparently wild on the Bertam river, Pahang.

Blumeodendron tokbrai, *J. J. Sm.* Public Gardens, K. Lumpur (Forest Dept.). A native of Sumatra, Java and Borneo.

Cicca disticha, *Linn.* K. Lumpur (Agri. Dept.). A small tree of Asia; in the Peninsula cultivated only.

Codiaeum variegatum, *Bl.* ("Croton"). Common in gardens in many varieties. A shrub, native of the Moluccas; in the Peninsula extensively cultivated as an ornamental shrub.

Croton tiglium, *Linn.* Rawang, cultivated, fide Foxworthy. A bush or small tree of Indo-Malaya and China; in the Peninsula in cultivated ground,

Euphorbia pulcherrima, Willd. *Poinsettia pulcherrima*, Grah. Common in gardens. A shrub of Trop. America; in the Peninsula often cultivated as an ornamental shrub.

Excoecaria bicolor, Hassk. Common in gardens. A shrub, origin doubtful; in the Peninsula often cultivated.

Hevea brasiliensis, Muell. Arg. (Rubber). A native of S. America.

Jatropha curcas, Linn. (The Purging nut). Serdang Experimental Plantation. A pantropic shrub, often cultivated in the Peninsula.

Manihot Glaziovii, Muell. Arg. (Ceara Rubber). A native of Brazil, occasionally cultivated in the Peninsula.

Manihot utilissima, Pohl. (Tapioca). A tall herb of South American origin, cultivated in all tropics.

Ricinus communis, Linn. (The Castor oil Plant). Cultivated, fide Foxworthy; Ulu Gombak, doubtless an escape, (Hume). Cultivated in all tropics, origin perhaps African.

URTICACEÆ.

Trema amboinensis, Bl. Batang Berjuntai; K. Lumpur; Seminyih; Ulu Gombak. A shrub or small tree of Indo-Australia in the Peninsula very common in waste ground and secondary growth.

Trema angustifolia, Bl. Klang Gates; K. Lumpur. A shrub of Borneo; in the Peninsula common in waste ground.

Trema virgata, Bl. Sungai Buloh (Ridley). A shrub of Tenasserim, Java, Borneo and China; in the Peninsula in waste ground but not common, Penang, Kelantan, Perak and Singapore.

Gironniera nervosa, Planch. K. Lumpur. A tree of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Gironniera parvifolia, Planch. Weld's Hill (Forest Dept.). A tree of the Carimon Islands; in the Peninsula common in forest from Penang to Singapore.

Gironniera subæqualis, Planch. Weld's Hill (Forest Dept.). A tall tree of Indo-Malaya to the Philippines, and S. China; in the Peninsula common in forest from Penang to Singapore.

Slætia sideroxylon, Teys. and Binn. Rantau Panjang; Weld's Hill. A tall tree of W. Malaysia; in the Peninsula not uncommon in forest from Penang and Pahang to Singapore.

Ficus acamptophylla, Miq. Public Gardens, K. Lumpur (Forest Dept.). An epiphytic climber or a tree of Bangka and Borneo; in the Peninsula not common in forest, Perak, Dindings, Singapore.

Ficus alba, *Reinw.* K. Lumpur; Ulu Gombak. A shrub or small tree of W. Malaysia; in the Peninsula very common in secondary growth and waste ground.

Ficus annulata, *Bl.* K. Lumpur. An epiphytic shrub or tree of Indo-Malaya; in the Peninsula common.

Ficus apiocarpa, *Miq.* K. Lumpur (Forest Dept.). A large climbing shrub of W. Malaysia to the Philippines; in the Peninsula common in forest.

Ficus bracteata, *Wall.* K. Lumpur (Curtis). A large shrub or small tree of Java and Borneo; in the Peninsula not very common, Taiping, Malacca and Singapore.

Ficus chartacea, *Wall.* Bukit Raja; Klang Gates; K. Lumpur; Ulu Gombak. A shrub of Burma; in the Peninsula common in forest from Langkawi to Singapore.

Ficus chrysocarpa, *Reinw.* Rantau Panjang; Ulu Gombak; Weld's Hill. A shrub of Burma to Borneo; in the Peninsula common from Taiping to Singapore.

Ficus consociata, *Bl.* K. Lumpur (Ridley). An epiphytic shrub of W. Malaysia; in the Peninsula Penang to Singapore.

Ficus cunia, *Ham.* Ulu Gombak (Hume). A shrub or small tree of India to Tenasserim; in the Peninsula common in forest from Perak and Kelantan to Johore.

Ficus diversifolia, *Bl.* Klang Gates (var. *ovoidea* and var. *Kunstleri*); K. Lumpur (var. *ovoidea* and var. *Kunstleri*); Ulu Gombak. A terrestrial or epiphytic shrub of W. Malaysia; in the Peninsula on seashores, in secondary growth, forests and open places, common and very variable.

Ficus fistulosa, *Reinw.* Weld's Hill (Forest Dept.). A tree of Indo-Malaya and China; in the Peninsula Kedah to Selangor and Pahang in forest.

Ficus fulva, *Reinw.* Ampang; Klang Gates; Ulu Gombak. A small tree of Indo-Malaya; in the Peninsula not common in forest, Taiping and Fraser Hill.

Ficus gibbosa, *Bl.* K. Lumpur (Forest Dept.). An epiphytic shrub, then a tree, of Indo-Malaya and S. China; in the Peninsula not common, Penang, Perak, Pulau Tioman, Negri Sembilan and Malacca.

Ficus glabella, *Bl.* Public Gardens, K. Lumpur (Forest Dept.). A tree of Indo-Malaya; in the Peninsula common.

Ficus glandulifera, *Wall.* Weld's Hill (Forest Dept.). A shrub or small tree of W. Malaysia; in the Peninsula not uncommon in forest from Penang to Singapore.

Ficus globosa, *Bl.* K. Lumpur; Ulu Gombak. A climbing shrub of Indo-Malaya; in the Peninsula common in secondary growth.

Ficus heterophylla, *Linn.* K. Lumpur (Ridley). A creeping shrub, eventually a small tree, of Indo-Malaya; in the Peninsula on riverbanks in Perak and Pahang.

Ficus hispida, *Linn. fil.* Batu Caves; Weld's Hill. A shrub or small tree of Indo-Australia; in the Peninsula common in forest from Kedah to Johore.

Ficus indica, *Linn.* Batu Caves; Klang Gates; Weld's Hill. A tree of Indo-Malaya to the Philippines; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Ficus lævis, *Bl.* Batu Caves (Ridley). An epiphytic shrub or small tree of Indo-Malaya; in the Peninsula Penang to Singapore in forest.

Ficus lepiciparpa, *Bl.* Ulu Gombak (Hume, Ridley). A small tree of W. Malaysia; in the Peninsula Penang to N. Johore in forest and on riverbanks.

Ficus microstoma, *Wall.* K. Lumpur (Ridley). A tree of Java; in the Peninsula Taiping, Malacca, Johore, Singapore, in forest.

Ficus Miquelii, *Hook. fil.* Batu Caves; Weld's Hill. A tree of Tenasserim and W. Malaysia; in the Peninsula common in the lowlands in forest.

Ficus obpyramidata, *Hook. fil.* Dusun Tua (Ridley). A small tree, endemic and rare, Taiping.

Ficus obscura, *Bl.* Ulu Gombak (Forest Dept.). A shrub or small tree of Indo-Malaya; in the Peninsula common in forest from Upper Perak to Singapore.

Ficus obtusa, *Hassk.* Klang Gates (Ridley). A climbing shrub of W. Malaysia to the Philippines; in the Peninsula Penang to Malacca in forest.

Ficus patens, *Ridl.* Kanching; Ulu Gombak. A large shrub, endemic, common in the Selangor hills, occurring also in Negri Sembilan.

Ficus pisifera, *Wall.* Klang Gates; K. Lumpur; Ulu Gombak. An epiphytic shrub, eventually a tree, of W. Malaysia to the Philippines; in the Peninsula common in forest.

Ficus polysyce, *Ridl.* K. Lumpur; Ulu Gombak. A tree of Lower Siam; in the Peninsula common from Langkawi to Singapore in forest and secondary growth.

Ficus pomifera, *Wall.* Dusun Tua (Ridley). A tree of Indo-Malaya (?except Borneo); in the Peninsula Upper Perak to Johore, not very common in forest.

Ficus punctata, *Thunb.* Batu Caves; Klang Gates; Seminyih; Ulu Gombak. A creeping shrub of W. Malaysia; in the Peninsula common from Penang to Singapore in open places.

Ficus ramentacea, *Roxb.* Batu Caves; Klang Gates; Ulu Gombak. A climbing shrub of Burma and W. Malaysia; in the Peninsula common.

Ficus recurva, *Bl.* Seminyih (Hume). An epiphytic climber of W. Malaysia to the Philippines; in the Peninsula common from Penang to Singapore in forest.

Ficus rostrata, *Lam.* Ampang; K. Lumpur; Ulu Gombak. An epiphytic shrub of Indo-Malaya; in the Peninsula common in forest and secondary growth.

Ficus subulata, *Bl.* Batu Caves; K. Lumpur. A climbing shrub of Indo-Malaya to the Philippines, and S. China; in the Peninsula common from Penang and Kelantan to Johore, in forest.

Ficus trachycarpa, *Miq.* Batu Caves (Ridley). An epiphytic shrub of W. Malaysia; in the Peninsula rare, Malacca.

Ficus truncata, *King.* K. Lumpur (Ridley). A tree of Java and Borneo in the Peninsula not common, Kelantan, Perak, Dindings, Pahang, Johore, Singapore.

Ficus urophylla, *Wall.* Ampang; K. Lumpur; Ulu Gombak. An epiphytic shrub of Indo-Malaya; in the Peninsula common in forest.

Ficus vasculosa, *Wall.* Weld's Hill (Forest Dept.). A small tree of Bangka, Java, Tavoy and China; in the Peninsula common from Penang to Singapore.

Ficus villosa, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Ulu Gombak. A climbing shrub of W. Malaysia to the Philippines; in the Peninsula common from Penang to Singapore.

Ficus xylophylla, *Wall.* K. Lumpur (Ridley). An epiphytic shrub or small tree of Sumatra and Borneo; in the Peninsula Penang to Singapore.

Antiaris toxicaria, *Lesch.* Batu Caves; Kajang; Sungai Buloh. A tall tree of Indo-Malaya; in the Peninsula Penang and Upper Perak to Malacca, in forest.

Artocarpus Denisoniana, *Hook. fil.* Klang Gates; Ulu Gombak. A tree, endemic and rare in forest, Ulu Bubong (Perak).

Artocarpus Gomeziana, *Wall.* Kepong; Klang Gates; K. Lumpur. A tree of Tenasserim and Borneo; in the Peninsula common in forest from Penang to Singapore.

Artocarpus Kunstleri, *Hook. fil.* Public Gardens, K. Lumpur (Forest Dept.). A tall tree, endemic and common in forest, Penang to Singapore.

Artocarpus Lakoocha, *Roxb.* K. Lumpur (Forest Dept.). A tree of S. India to Lower Siam; in the Peninsula common in secondary growth and open places.

Artocarpus lanceaefolia, *Rorb.* Ampang; Ulu Gombak; Weld's Hill. A tall tree, endemic and common in forest from Penang to Singapore.

Artocarpus Lowii, *Hook. fil.* Weld's Hill and the Public Gardens, K. Lumpur (Forest Dept.). A tree, endemic, not common, Taiping, and Raub (Pahang).

Artocarpus Maingayi, *Hook. fil.* K. Lumpur (Forest Dept.). A small tree, endemic, Taiping to Singapore, in forest.

Artocarpus peduncularis, *Kurz.* K. Lumpur. A tree of Tenasserim and Lower Siam; in the Peninsula common in forest.

Artocarpus polyphema, *Pers.* K. Lumpur (Forest Dept.). A small tree of W. Malaysia and Indo-China; in the Peninsula commonly cultivated, and wild in Perak, Pahang and Negri Sembilan, in forest.

Artocarpus rigida, *Bl.* K. Lumpur; Sungai Buloh. A tall tree of Burma, Sumatra and Java; in the Peninsula common in forest from Taiping to Singapore.

Conocephalus amœnus, *Hook. fil.* Batu Caves; K. Lumpur. A stout epiphytic climber of Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Conocephalus Scortechinii, *Hook. fil.* K. Lumpur; Sungai Buloh. An epiphytic climber of Borneo; in the Peninsula Perlis to Singapore, in forest.

Conocephalus suaveolens, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Petaling; Seminyih. An epiphytic climber of Indo-Malaya and the Philippines; in the Peninsula common in forest.

Conocephalus subtrinervius, *Miq.* Petaling; Seminyih; Ulu Gombak. An erect epiphytic shrub of ?Sumatra and Borneo; in the Peninsula common in forest from Penang to Johore.

Hullettia dumosa, *King.* Klang Gates; K. Lumpur; Seminyih. A shrub, endemic, not uncommon in forest from Taiping to Negri Sembilan.

Fleurya interrupta, *Gaud.* Ulu Gombak (Hume). A herb of the Tropics of the Old World; in the Peninsula a common weed.

Laportea stimulans, *Miq.* Batu Caves (Ridley). A small tree with stinging hairs, of Siam, Java and Borneo; in the Peninsula Kedah and Kemaman to Malacca in forest.

Pilea muscosa, *Lindl.* Common in K. Lumpur. A small herb, endemic, on limestone in Kelantan and Perak.

Pilea muscosa, *Lindl.* Common in K. Lumpur. A small fleshy herb of S. America; in the Peninsula a common weed.

Pellionia Duvauana, *N. E. Br.*, var. *viridis*, *Ridl.* Batu Caves (Ridley). A creeping herb of Tenasserim; in the Peninsula common in forest from Setul and Kelantan to Negri Sembilan.

Pellionia Helferiana, *Wedd.* Batu Caves; Ulu Gombak. A herb of Tenasserim and Lower Siam; in the Peninsula not very common in forest, Pahang, Selangor and Johore.

Elatostemma acuminatum, *Brngn.* Ulu Gombak (Hume). A herb of Himalaya, Ceylon, Tenasserim and Java; in the Peninsula usually montane in the Taiping Hills and on the Main Range.

Elatostemma platyphyllum, *Wedd.* Batu Caves; K. Lumpur. A tall herb of India; in the Peninsula not common, Penang, Kelantan, ?Taiping.

Elatostemma sessile, *Forst.* K. Lumpur; Ulu Gombak. A herb of Africa, Asia and Polynesia; in the Peninsula common on rocks in streams, Penang and Upper Perak to Selangor.

Procris latifolia, *Bl.* Batu Caves; Dusun Tua; Ulu Gombak. A small succulent herb of Tenasserim to Samoa; in the Peninsula Upper Perak to Selangor, in forest.

Pouzolzia indica, *Gaud.* Klang Gates; Seminyih; Ulu Gombak. A herb of Indo-Malaya and China; in the Peninsula a common weed in waste ground.

Pipturus mollissimus, *Wedd.* Batu Caves; Klang Gates. A climbing shrub of Java; in the Peninsula not common in forest, Penang, Perak, Klang, Johore, Singapore.

Villebrunea sylvatica, *Bl.* Batu Caves; Ulu Gombak. A tree of Java; in the Peninsula not common in forest, Negri Sembilan.

Debregeasia squamata, *Hook. fil.* Batu Caves; Ulu Gombak. A shrub, endemic, not common in forest, Perak.

CULTIVATED URTICACEÆ.

Artocarpus incisa, *Linn. fil.* (Bread fruit tree). A native of the Pacific Islands, often cultivated in the Peninsula.

Artocarpus integrifolia, *Linn. fil.* (Jack fruit). A tree of Indo-Malaya; in the Peninsula commonly cultivated.

Bœhmeria nivea, *Hook. and Arn.* (Ramie). Ulu Gombak (Hume), an escape from cultivation. A shrub of Trop. Asia; in the Peninsula cultivated only.

Ficus Benjamina, *Linn.* A tree of Indo-Malaya; in the Peninsula often planted, but not wild.

Ficus elastica, *Rorb.* Cultivated, fide Foxworthy. A shrub or tree of Indo-Malaya; in the Peninsula formerly cultivated as a rubber producing plant, and very doubtfully wild.

Morus alba, *Linn.* (Mulberry). K. Lumpur Forest Dept.). A small tree of Asia; in the Peninsula occasionally cultivated.

CASUARINACEÆ, CULTIVATED.

Casuarina equisetifolia, *Forst.* Often planted in gardens and by roadsides. A tall tree of Indo-Australia; in the Peninsula wild on sandy seacoasts.

CUPULIFERÆ.

Pasania Curtisii, *Gamble.* Rawang; Weld's Hill. A tree, endemic, not common in forest, Penang, Perak.

Pasania cyclophora, *Gamble.* Ulu Gombak (Hume). A tall tree of Borneo; in the Peninsula usually in montane forest, Penang to Singapore.

Pasania discocarpa, *Gamble.* Weld's Hill (Forest Dept.). A tall tree of Sumatra, Bangka and Borneo; in the Peninsula apparently rare, Taiping Hills and Gunong Bubu.

Pasania Eichleri, *Gamble.* Rawang (Ridley). A tall tree of Sumatra; in the Peninsula not common in forest, Perak and Pahang.

Pasania encleisacarpa, *Gamble.* Kanching; Rawang; Sungai Buloh. A tree of Sumatra; in the Peninsula common in forest from Penang to Singapore.

Pasania erythrocarpa, *Ridl.* Ulu Gombak (Forest Dept. 11198). A tree, endemic and rare in forest, hitherto known only from Gunong Angsi, Negri Sembilan.

Pasania Ewyckii, *Gamble.* Ampang (Forest Dept.). A tree of Sumatra and Borneo; in the Peninsula Penang to Singapore in forest.

Pasania hystrix, *Gamble.* Bukit Cheraka; Kajang; K. Lumpur; Sungai Buloh. A tall tree of Sumatra and Borneo; in the Peninsula common in the lowlands from Penang to Singapore.

Pasania Kunstleri, *Gamble.* Kanching; K. Lumpur. A tree of Borneo; in the Peninsula not very common in forest, Langkawi and Perak.

Pasania lamponga, *Gamble.* Klang Gates; K. Lumpur (var. *ewyckiioides*, *Gamble*); Ulu Gombak; Weld's Hill. A tall tree of Sumatra, Bangka and Borneo to Papua; in the Peninsula common in forest from Penang to Singapore.

Pasania lucida, *Gamble.* Ulu Gombak (Forest Dept.). A tree, endemic and common in forest.

Pasania Maingayi, *Schky.* Ulu Gombak (Hume). A lofty tree, endemic, not common in forest, Penang Hill and the Semangkok Pass.

Pasania rassa, *Gamble.* Sungai Buloh; Ulu Gombak. A tree of W. Malaysia; in the Peninsula Penang to Singapore in forest, usually at some altitude.

Pasania spicata, *Oerst.* Weld's Hill and the Public Gardens, K. Lumpur (Forest Dept.). A tall tree of Indo-Malaya; in the Peninsula common in forest.

Pasania surdaica, *Oerst.* Seminyih; Ulu Gombak. A tree of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

Pasania Wallichiana, *Gamble.* Weld's Hill (Forest Dept.). A tree, endemic and common in forest from Penang to Singapore.

Castanopsis fulva, *Gamble.* Sungai Buloh (Forest Dept.). A tall tree, endemic, not common, Perak, ?Negri Sembilan, ?Singapore.

Castanopsis megacarpa, *Gamble.* Klang Gates; Ulu Gombak; Weld's Hill. A tall tree, endemic, common in forest from Penang to Singapore.

Castanopsis nepheliodes, *King.* Bukit Puteh; K. Lumpur. A tree, endemic and common in forest from Taiping to Singapore.

Castanopsis sumatrana, *A. DC.* Bukit Cheraka; Weld's Hill. A tree of Indo-Malaya to the Philippines; in the Peninsula Penang to Malacca, common in forest.

Castanopsis Wallichii, *King.* K. Lumpur (Forest Dept.). A tall tree, endemic and common in forest.

SALICINACEÆ.

Salix tetrasperma, *Roxb.* Rawang; Weld's Hill. A small tree of E. Asia; in the Peninsula common from Penang and Kelantan to Malacca, in roadside ditches and edges of ricefields.

HYDROCHARIDACEÆ.

Ottelia alismoides, *Pers.* Pudu (Goodenough). An aquatic herb of Trop. Africa, Trop. Asia and Australia; in the Peninsula common in ponds and ditches.

ORCHIDACEÆ.

Oberonia aurantiaca, *Ridl.* Kajang (Goodenough). A small epiphyte, endemic and local.

Oberonia grandis, *Ridl.* Ulu Langat, (Kloss, fide Ridley). An epiphytic herb, endemic and local.

Liparis parvifolia, *Lindl.* Batu Caves (Ridley). An epiphytic herb of Siam to the Philippines; in the Peninsula common from Upper Perak to Singapore in forest.

Platyclinis gracilis, *Hook. fil.* Ulu Gombak (Hume). An epiphyte of Java; in the Peninsula montane in Perak and Pahang.

Dendrobium atropurpureum, *Miq.* Batu Caves; K. Lumpur. A small epiphyte of Tenasserim to Borneo; in the Peninsula common from Langkawi to Singapore.

Dendrobium calcaratum, *Lindl.* Seminyih (Hume). A terrestrial herb of Borneo; in the Peninsula in wet places, Malacca and Singapore.

Dendrobium crocatum, *Hook. fil.* Ulu Gombak (Ridley). An epiphyte, endemic, Perak and Pahang to Singapore, in forest.

Dendrobium crumenatum, *Swartz.* (The Pigeon Orchid). Common on roadside and other trees. An epiphyte of Indo-Malaya to the Philippines and China; in the Peninsula common.

Dendrobium ?eulophotum, *Lindl.* Seminyih (Hume).

Dendrobium gemellum, *Lindl.* Rantau Panjang (Hume). An epiphyte of Siam to Borneo; in the Peninsula Langkawi to Singapore.

Dendrobium grande, *Hook. fil.* K. Lumpur; Rawang. An epiphyte of ?Tenasserim and Lower Siam; in the Peninsula common from Penang and Kelantan to Singapore in forest.

Dendrobium lamellatum, *Lindl.* K. Lumpur (Curtis). An epiphyte of Tenasserim, Java and Borneo; in the Peninsula not common, Kedah to Singapore.

Dendrobium leonis, *Rchb.* Rawang; Seminyih. An epiphyte of Borneo and Indo-China; in the Peninsula common in forest from Penang to Singapore.

Dendrobium pallens, *Ridl.* ?MS. High up on the Batu Caves (Ridley). A rare orchid, known also from Siam.

Dendrobium pumilum, *Roxb.* Kajang; Seminyih. An epiphyte of Burma and Borneo; in the Peninsula common.

Dendrobium subulatum, *Hook. fil.* Batu Caves; K. Lumpur. An epiphyte of Java and Borneo; in the Peninsula Penang to Singapore.

Dendrobium truncatum, *Lindl.* Batu Caves (Ridley). An epiphyte of W. Malaysia; in the Peninsula not common, Kedah, Perak and Pahang.

Bulbophyllum flammuliferum, *Ridl.* Batu Caves (Ridley). An epiphyte, endemic and rare on limestone and mangrove, Port Dickson.

Bulbophyllum membranifolium, *Hook. fil.* K. Lumpur (Curtis). An epiphyte, endemic, not common, Perak and Pahang.

Bulbophyllum pileatum, *Lindl.* Rawang (Ridley). An epiphyte of Sumatra; in the Peninsula not common, Penang, Perak, Johore and Singapore.

Bulbophyllum vaginatum, *Rchb.* Petaling (Ridley). An epiphyte of Java and Borneo; in the Peninsula common.

Eria pendula, *Ridl.* Batu Caves (Ridley). An epiphyte of Sumatra and Borneo; in the Peninsula rare, Perak.

Trichotosia hispidissima, *Kranzl.* Ulu Langat (Goodenough). An epiphyte of Borneo; in the Peninsula rare, known only from this locality.

Phreatia linearis, *Ridl.* Ulu Langat (Kloss, fide Ridley). A small epiphyte of ?Sumatra; in the Peninsula rare, known only from this locality.

Phreatia minutiflora, *Lindl.* Batu Caves (Ridley). A small epiphyte of Sumatra, Borneo, Celebes, the Philippines and Samoa; in the Peninsula on mangrove trees and limestone, Setul, Perak, Johore, Singapore.

Agrostophyllum bicuspidatum, *J. J. Sm.* Seminyih (Hume). An epiphyte of Tenasserim to Celebes; in the Peninsula very common in forest from Kedah to Singapore.

Agrostophyllum callosum, *Rchb.* Rawang (Ridley). An epiphyte of Himalaya and Burma; in the Peninsula rare, Fraser Hill and Bukit Hitam (Selangor).

Agrostophyllum glumaceum, *Hook. fil.* Rawang; Seminyih; Ulu Gombak. A small epiphyte, endemic, Perak to Negri Sembilan in forest.

Agrostophyllum majus, *Hook. fil.* Ulu Gombak (Hume). An epiphyte of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Ceratostylis cryptantha, *Ridl.* Ulu Gombak (Hume). A small epiphyte, endemic, not common, Penang, Perak, Semangkok.

Ceratostylis pendula, *Hook. fil.* Kajang (Goodenough). An epiphyte of Borneo to the Philippines; in the Peninsula, Penang, Taiping, Selangor, Pahang, Johore, in forest.

Spathoglottis plicata, *Bl.* K. Lumpur; Seminyih; Sungai Buloh; Ulu Gombak. A terrestrial herb of W. Malaysia to New Guinea; in the Peninsula common in open places.

Calanthe veratrifolia, *R. Br.* Ulu Gombak (Hume). A terrestrial herb of Java; in the Peninsula Perak and Pahang to Malacca, in forest.

Calanthe veratrifolia, *R. Br.* Ulu Gombak (Hume). A terrestrial herb of Indo-Australia; in the Peninsula not uncommon in forest from the Taiping Hills to Singapore.

Preptanthe vestita, *Rehb. fil.* Top of the Batu Caves (Ridley). An epiphyte of Tenasserim, Borneo and Celebes; in the Peninsula very rare, doubtfully also from Pulau Adang.

Phaius Wallichii, *Lindl.* K. Lumpur (Ridley). A herb of Indo-Malaya and Polynesia; in the Peninsula not very common, Kedah, Penang, Pahang, Malacca, Johore, but often cultivated.

Cœlogyne pandurata, *Lindl.* Rawang; Ulu Gombak. An epiphyte of Sumatra and Borneo; in the Peninsula common in forest in Perak and Selangor.

Cœlogyne Rochussenii, *De Vriese.* Rawang (Ridley). An epiphyte of W. Malaysia; in the Peninsula common in forest.

Pholidota imbricata, *Lindl.* Batu Caves (Ridley). An epiphyte of Indo-Malaya to the Philippines; in the Peninsula not common, Langkawi and Perak.

Claderia viridiflora, *Hook. fil.* Seminyih; Ulu Gombak. A terrestrial herb of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Eulophia graminea, *Lindl.* Damansara Rd.; Rawang; Seminyih; Ulu Gombak. A herb of India, Siam and Rhio; in the Peninsula common in open places from Setul to Singapore.

Eulophia squalida, *Lindl.* K. Lumpur; Petaling. A terrestrial herb of W. Malaysia to the Philippines; in the Peninsula common in open grassy places.

Plocoglottis foetida, *Ridl.* K. Lumpur; Rawang; Sungai Buloh. A tall herb, endemic, Perak to Singapore, in forest.

Plocoglottis javanica, *Bl.* Seminyih; Ulu Gombak. A terrestrial herb of Java and Borneo; in the Peninsula common in forest from Kedah to Singapore.

Plocoglottis porphyrophylla, *Ridl.* Seminyih; Ulu Gombak. A terrestrial herb of Sumatra and Borneo; in the Peninsula common, usually near the sea.

Grammatophyllum speciosum, *Bl.* K. Lumpur (Ridley). A very big epiphyte of Tenasserim to the Solomon Islands; in the Peninsula common in forest from Kedah to Singapore.

Bromheadia palustris, *Lindl.* Ulu Gombak (Hume). A terrestrial herb of W. Malaysia and Indo-China; in the Peninsula common in open places.

Adenoncos parviflora, *Lindl.* Batu Caves (Kelsall). A small epiphyte, endemic and local, rare.

Adenoncos virens, *Bl.* Batu Caves (Ridley). A small epiphyte of W. Malaysia; in the Peninsula common in forest and mangrove from Perak to Singapore.

Trichoglottis retusa, *Bl.* Batu Caves (Kelsall). A tall herb of Siam, Indo-China, Java, Borneo and the Philippines; in the Peninsula rare on limestone.

Saccolabium angræcum, *Ridl.* Batu Caves (Ridley). An epiphyte of Java; in the Peninsula rare, known only from this locality.

Saccolabium densiflorum, *Lindl.* Rawang (Ridley). An epiphyte of Indo-Malaya; in the Peninsula not common, Penang, Perak and Singapore.

Saccolabium latifolium, *Ridl.* Batu Caves (Kelsall), and var. *striatum*, *Ridl.* (Ridley). An epiphyte of Sumatra; in the Peninsula Setul to Johore in forest.

Saccolabium macrantherum, *Ridl.*, *Kew Bull.*, 10, 1926, p. 478. Ulu Gombak (Hume). A small epiphyte, endemic and local.

Saccolabium minimiflorum, *Hook. fil.* Batu Caves (Ridley). A small epiphyte of Siam; in the Peninsula rare, Perak.

Saccolabium tenuicaule, *Hook. fil.* Batu Caves (Ridley). An epiphyte, endemic and rare, Penang and Perak.

Microsaccus javensis, *Bl.* Batu Caves (Kelsall). A small epiphyte of Burma, Tenasserim, Siam, Java and Indo-China; in the Peninsula not common, Perak and Singapore.

Tæniophyllum macrorrhizum, *Ridl.* Batu Caves; Petaling. A small epiphyte, endemic, Langkawi, Perak, Pahang, Johore.

Tæniophyllum serrula, *Hook. fil.* Batu Caves; K. Lumpur. An epiphyte of Lower Siam; in the Peninsula common from Setul to Singapore.

Sarcochilus caligaris, *Ridl.* Batu Caves (Ridley). An epiphyte, endemic, not common in forest, Perak, Pahang, Negri Sembilan, Singapore.

Ascochilus hirtus, *Ridl.* Batu Caves (Ridley). A small epiphyte, endemic, Langkawi and Kelantan to Malacca, in forest.

Thrixspermum arachnites, *Rchb. fil.* Ulu Langat (Kloss, fide Ridley). An epiphyte of W. Malaysia; in the Peninsula common from Penang and Kelantan to Singapore.

Thrixspermum crassifolium, *Ridl.* Rantau Panjang (Hume). An epiphyte, endemic and rare, Pahang, Johore.

Thrixspermum lilacinum, *Rchb. fil.* Pudu (Goodenough). A terrestrial herb of Java and Borneo; in the Peninsula common in open grassy places.

Thrixspermum montanum, *Ridl.* Ulu Langat (Kloss, fide Ridley). A herb, endemic and local.

Thrixspermum notabile, *Ridl.* Seminyih (Hume). An epiphyte, endemic, not common, Perak, Johore and Singapore.

Dendrocolla filiformis, *Ridl.* Seminyih (Hume). An epiphyte of Lower Siam; in the Peninsula not common, Upper Perak to Singapore.

Acriopsis javanica, *Reinw.* Batu Tiga; Ulu Gombak. An epiphyte of Tenasserim to New Guinea; in the Peninsula common from Penang to Singapore.

Appendicula anceps, *Bl.* Batu Caves; Rawang. An epiphyte of Java, Borneo and the Philippines; in the Peninsula common in forest from Penang and Upper Perak to Singapore.

Appendicula cornuta, *Bl.* Ulu Gombak (Hume). A tufted epiphyte of Indo-Malaya to the Philippines, and S. China; in the Peninsula common in forest from Kedah to Singapore.

Appendicula purpurascens, *De Vriese.* Ulu Gombak (Ridley). An epiphyte of W. Malaysia to the Philippines; in the Peninsula Perak and Pahang to Selangor, usually montane.

Appendicula torta, *Bl.* Batu Caves; Rawang; Ulu Gombak. A tufted epiphyte of Java and Borneo; in the Peninsula not common in forest, Perak, Pahang and Johore.

Appendicula uncata, *Ridl.* Petaling (Ridley). A tufted epiphyte, endemic and rare, Fraser Hill and Singapore.

Thelasis capitata, *Bl.* Batu Caves (Ridley). An epiphyte of W. Malaysia to the Philippines; in the Peninsula not common in forest, Perak and Pahang.

Thelasis carinata, *Bl.* Batu Caves (Ridley). An epiphyte of W. Malaysia to the Philippines; in the Peninsula common in forest and mangrove from Kedah to Singapore.

Galeola Hydra, *Rchb.* Batu Caves; Kajang; K. Lumpur; Ulu Gombak. A saprophytic herb of Indo-Malaya to Java; in the Peninsula common in open places.

Aphyllorchis pallida, *Bl.* Seminyih (Hume). A saprophyte of Java, Borneo and the Philippines; in the Peninsula Penang and Upper Perak to Singapore in forest, commonest in the north.

Lecanorchis malaccensis, *Ridl.* Seminyih (Hume). A saprophytic herb of Siam and Borneo; in the Peninsula common in forest from Kedah to Singapore.

Corymbis longiflora, *Hook. fil.* Batu Caves; Ulu Gombak. A tall terrestrial orchid of Africa and Indo-Australia; in the Peninsula common in forest from Langkawi to Singapore.

Tropidia curculigoides, *Lindl.* Seminyih (Hume). A terrestrial herb of India and Borneo; in the Peninsula common in forest, usually montane.

Vrydagzynea lancifolia, *Ridl.* Ulu Gombak (Hume). A small herb, endemic, not very common in forest, Langkawi to Singapore.

Anæctochilus Reinwardtii, *Bl.* Ulu Gombak (Hume). A small terrestrial herb of Sumatra and Java; in the Peninsula Kedah, ?Penang, Perak, in forest.

Zeuxine clandestina, *Bl.* Ulu Gombak (Hume). A small terrestrial herb of Java; in the Peninsula not common, Penang, Negri Sembilan and Singapore.

CULTIVATED ORCHIDACEÆ.

Arundina speciosa, *Bl.* K. Lumpur on railway banks, planted or run wild (Ridley). A tall terrestrial herb of Burma, Java and Borneo; in the Peninsula commonly cultivated and wild in Setul and on Kedah Peak.

Paphiopedilum barbatum, *Pftz.* *Cypripedium barbatum Lindl.* A terrestrial herb of Siam; in the Peninsula montane, Kedah Peak, Penang Hill, Mt. Ophir, Gunong Belumut (Johore), and often cultivated.

Vanda Hookeriana, *Rehb. fil.* A sprawling orchid of Borneo; in the Peninsula common in the Kinta Valley, Perak, and occurring also in Johore, and often cultivated.

Vanilla planifolia, *Andr.* (Vanilla). Serdang Experimental Plantation. A climber of the West Indies, occasionally cultivated in the Peninsula.

ZINGIBERACEÆ.

Globba aurantiaca, *Miq.* Batu Caves; Kajang; Klang Gates; Seminyih; Sungai Buloh; Ulu Gombak; Weld's Hill. A herb of Sumatra and Borneo; in the Peninsula common in forest from Penang to Johore.

Globba cernua, *Bok.* Ulu Gombak (Hume). A herb, endemic, not uncommon north of Negri Sembilan, usually in montane forest.

Globba panicoides, *Miq.* Batang Berjuntai; Batu Caves; Klang Gates; K. Lumpur; Rantau Panjang; Seminyih. A tufted herb of Sumatra and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Globba perakensis, *Ridl.* Klang Gates; Ulu Gombak. A herb, endemic, Upper Perak and Kelantan to Pulau Tioman, in forest.

Globba uliginosa, *Miq.* Batang Berjuntai (Hume). A herb of Sumatra and Bangka; in the Peninsula not very common in forest, Penang to Singapore.

Globba variabilis, *Ridl.* Seminyih (Hume). A herb of Lingga and Borneo; in the Peninsula not uncommon in forest from Perak and Kelantan to Johore.

Camptandra parvula, *Ridl.* Ulu Gombak (Hume). A small herb, endemic, common in forest in the north.

Gastrochilus longifolia, *Ridl.* Ulu Gombak (Ridley). A herb, endemic and local.

Gastrochilus plicata, *Ridl.* Klang Gates (Ridley). A tufted herb, endemic and not common in forest, Upper Perak, Kelantan, Pahang and Johore.

Costus globosus, *Bl.* Batu Caves; Dusun Tua; Klang Gates; Petaling; Seminyih. A herb of W. Malaysia; in the Peninsula common in forest from Upper Perak to Singapore.

Costus speciosus, *Sm.* Klang Gates; Petaling; Seminyih; Ulu Gombak. A herb, widely Indo-Malayan; in the Peninsula common in open places from Perlis to Singapore.

Zingiber citrinum, *Ridl.* Dusun Tua; Kanching. A herb, endemic, not common in forest, Perak, Pahang, Selangor, Negri Sembilan, Johore.

Zingiber gracile, *Jack.* Kanching; K. Lumpur; Petaling; Ulu Gombak. A herb, endemic and common in forest from Penang to Singapore.

Zingiber spectabile, *Griff.* Petaling (Ridley). A herb of Sumatra; in the Peninsula common in forest north of Malacca.

Amomum hastilabium, *Ridl.* Dusun Tua (Ridley). A tall herb, endemic, not common in forest, Perak, Johore, Singapore.

Amomum lappaceum, *Ridl.* Ulu Gombak (Hume). A tall herb, endemic, Perak, Selangor, Pahang, Johore, in forest.

Amomum micranthum, *Ridl.* Batu Tiga (Ridley). A herb, endemic, not common in forest, Penang to Negri Sembilan.

Amomum testaceum, *Ridl.* Batu Caves (Ridley). A tall herb, endemic, not common, often near limestone, Setul, Perlis, Perak, Pulau Tioman.

Amomum uliginosum, *Koen.* Dusun Tua (Ridley). A tall herb of Siam and Borneo; in the Peninsula common in forest from Kedah to Johore.

Hornstedtia albomarginata, *Ridl.* Bukit Raja; Petaling; Sungai Buloh. A large herb, endemic, Penang and Kelantan to Negri Sembilan, not uncommon, especially in the hills.

Hornstedtia pauciflora, *Ridl.* Batu Caves (Ridley). A tall herb, endemic and rare, near limestone, Gunong Inas (Perak).

Hornstedtia macrochilus, *Ridl.* Bukit Raja (Burkill). A tall herb, endemic, not very common in forest, Upper Perak and Kelantan to Singapore.

Hornstedtia megalochilus, *Ridl.* Klang Gates; K. Lumpur; Ulu Gombak. A tall herb of Lower Siam and Sumatra; in the Peninsula common in forest from Setul and Kelantan to Singapore.

Hornstedtia metriochilus, *Ridl.* Batu Caves; Petaling; Ulu Gombak. A tall herb, endemic, common in forest from Penang and Kelantan to Johore.

Hornstedtia scyphus, *Retz.* Bukit Raja; K. Lumpur; Ulu Gombak. A tall herb of Sumatra and Borneo; in the Peninsula common in forest from Taiping to Singapore.

Phaemeria imperialis, *Lindl.*, var. *speciosa*, *Ridl.* Rawang (Ridley). A tall herb of Sumatra and Java (the species); in the Peninsula the species often cultivated and persisting in abandoned ground, the var. wild in the Taiping Hills and at Ipoh.

Phaemeria Maingayi, *Schum.* Dusun Tua; Klang Gates. A tall herb, endemic, Upper Perak and Kelantan to Singapore in forest.

Plagiostachys lateralis, *Ridl.* Bukit Raja (Burkill). A tall herb, endemic, Upper Perak to Singapore, in forest.

Elettariopsis Curtisii, *Bak.* Bukit Raja (Burkill). A herb, endemic and rare, Penang Hill.

Elettariopsis latiflora, *Ridl.* Sungai Buloh (Good-enough). A creeping herb, endemic, not common in forest, Kedah Peak to Singapore.

Alpinia cannæfolia, *Ridl.* Dusun Tua (Ridley). A herb, endemic, rare, Negri Sembilan.

Alpinia javanica, *Bl.* Batu Caves; Klang Gates; K. Lumpur; Seminyih. A herb of Sumatra and Java; in the Peninsula common in forest from Perak and Kelantan to Johore.

Alpinia Rafflesiana, *Wall.* Ulu Gombak (Hume). A herb, endemic and common in forest from Penang to Singapore.

Alpinia vitellina, *Ridl.* Dusun Tua (Ridley). A herb, endemic, not common in forest, Penang and Johore.

CULTIVATED ZINGIBERACEÆ.

Alpinia Galanga, *Sw.* Circular Road Plantation, K. Lumpur (Forest Dept.). A tall herb of Indo-Malaya to the Philippines and Moluccas; in the Peninsula commonly cultivated and persisting in abandoned ground.

Curcuma domestica, *Valet.* (Turmeric). A herb of Java, commonly cultivated in the Peninsula.

Hedychium coronarium, *Linn.* Common in gardens. A herb of India, cultivated in most tropical countries.

Kæmpferia Galanga, *Linn.* A herb of Indo-Malaya; in the Peninsula often cultivated and escaping.

Zingiber officinale, *Rosc.* (Ginger). A herb, native of Trop. Asia and cultivated in all tropics.

MARANTACEÆ.

Donax arundastrum, *Lour.* Batu Caves (Ridley). A tall herb of Burma, Indo-China, Sumatra and Borneo; in the Peninsula not very common, Upper Perak and Kelantan to Johore, often in tidal rivers.

Donax grandis, *Ridl.* Batu Caves; Klang Gates; Rawang; Seminyih; Ulu Gombak. A tall herbaceous plant of Tenasserim, Siam, Sumatra and Borneo; in the Peninsula common in forest.

Stachyphrynium Jagoranum, *Schum.* Batu Caves; Dusun Tua; K. Lumpur. A herb, endemic, Setul to Negri Sembilan, commonest in the north in open places.

Phrynium hirtum, *Ridl.* Dusun Tua; Ulu Gombak. A stemless herb, endemic and common in forest from Kedah to Johore.

Phrynium malaccense, *Ridl.* Kuang; Petaling; Ulu Gombak. A stemless herb of Lower Siam; in the Peninsula common in forest from Langkawi to Johore.

Phrynium tristachyum, *Ridl.* Bukit Lagong (Burkill and Foxworthy). A stemless herb, endemic and local.

CULTIVATED MARANTACEÆ.

Maranta arundinacea, *Linn.* (Arrow-root). Serdang Experimental Plantation. A herb of S. America, cultivated in the Peninsula usually as an ornamental plant

CANNACEÆ, CULTIVATED.

Canna orientalis, *Rosc.* In gardens, and occurring in waste ground. A tall herb, probably native of India.

LOWIACEÆ.

Orchidantha longiflora, *Ridl.* Batu Caves; Klang Gates; Ulu Langat. A large tufted plant, endemic and not uncommon in forest, but not often flowering.

MUSACEÆ.

Musa malaccensis, *Ridl.* K. Lumpur; Ulu Gombak. An arborescent herb, endemic, common from Perlis to north Johore, in forest.

Musa violascens, *Ridl.* K. Lumpur; Petaling; Ulu Gombak. An arborescent herb of Borneo; in the Peninsula common in forest from Upper Perak and Pahang to Negri Sembilan.

CULTIVATED MUSACEÆ.

Musa sapientium, *Linn.* (Banana or Plantain). An arborescent herb of uncertain origin, cultivated in most tropical countries.

Musa textilis, *Nees.* (Manila Hemp). Serdang Experimental Plantation. An arborescent herb of the Philippines; in the Peninsula occasionally cultivated.

Ravenala madagascariensis, *Sonn.* (The Travellers' Palm). Common in gardens. An arborescent herb of Madagascar; in the Peninsula often cultivated.

APOSTASIACEÆ.

Apostasia latifolia, *Rolfe.* Ulu Gombak (Hume). A climber, endemic, not common in forest, Perak and Mt. Ophir.

Apostasia nuda, *R. Br.* Seminyih (Hume). A woody herb of Indo-Malaya; in the Peninsula Kedah to Singapore, in forest.

Apostasia Wallichii, *Br.* Seminyih (Hume). A woody climbing herb of Indo-Malaya to New Guinea; in the Peninsula not very common in forest, Penang to Johore.

BROMELIACEÆ, CULTIVATED.

Ananas sativus, *Schultes fl.* (Pineapple). A herb, pantropic in cultivation, native of Trop. America.

HAEMODORACEÆ, CULTIVATED.

Sansevieria zeylanica, *Willd.* (Bow String Hemp). Cultivated in various localities. A succulent plant of Trop. Asia and Africa, often cultivated in the Peninsula.

IRIDACEÆ, CULTIVATED.

Trimezia lurida, *Salisb.* Public Gardens, K. Lumpur, in grass, escaping from cultivation. Native of Mexico.

AMARYLLIDACEÆ.

Curculigo latifolia, *Dryand.* K. Lumpur; Seminyih; Ulu Gombak. A herb of Indo-Malaya; in the Peninsula common in forest.

Curculigo villosa, *Wall.* Batu Tiga (Ridley). A herb of W. Malaysia; in the Peninsula common in open places in the south.

CULTIVATED AMARYLLIDACEÆ.

Agave rigida, *Mill.*, var *sisalana*. (Sisal Hemp). Serdang Experimental Plantation. A succulent plant of Mexico; in the Peninsula cultivated for fibre and as an ornament.

Furcraea gigantea, *Vent.* (Mauritius Hemp). Serdang Experimental Plantation. A succulent plant of Trop. America; in the Peninsula cultivated for fibre.

BURMANNIACEÆ.

Burmannia coelestis, *Don.* Ampang (Brooks). A herb of Indo-Australia and China; in the Peninsula common in open sandy places.

Burmannia tuberosa, *Becc.* Petaling (Ridley). A small saprophyte of Borneo and New Guinea; in the Peninsula Kedah to Singapore, in damp places in forest.

Gymnosiphon aphyllum, *Bl.* Petaling (Ridley). A small saprophyte of Sumatra and Borneo to Papua; in the Peninsula common in forest but sporadic.

Thismia aseræ, *Becc.* Petaling (Ridley). A small saprophyte, endemic, not common in forest, Pahang and Singapore.

Thismia fumida, *Ridl.* Petaling (Ridley). A small saprophyte, endemic, very rare, known also from Chan Chu Kang (Singapore).

TACCACEÆ.

Tacca cristata, *Jack.* Batang Berjuntai; Kanching; Rantau Panjang; K. Lumpur; Sungai Buloh; Ulu Langat. A herb of Burma; in the Peninsula common in forest.

DIOSCOREACEÆ.

Stenomeris borneensis, *Oliv.* Batu Caves (Ridley). A slender climber of Borneo; in the Peninsula very rare, known only from this locality.

Dioscorea bulbifera, *Linn.* Batu Caves; Bukit Raja; K. Lumpur. A climber of Africa and Indo-Australia; in the Peninsula common in waste ground from Langkawi to Singapore.

Dioscorea laurifolia, *Wall.* K. Lumpur; Ulu Gombak. A climber, endemic and common on forest edges.

Dioscorea polyclades, *Hook. fil.* Rawang; Ulu Gombak; Weld's Hill. A climber of W. Malaysia; in the Peninsula not very common on forest edges, Kelantan, Perak, Pahang, Negri Sembilan, Johore and Singapore.

Dioscorea Porteri, *Prain and Burkill.* Bukit Raja; Sungai Buloh; Weld's Hill. A climber, endemic, Kedah, Penang, Province Wellesley, Negri Sembilan, Johore and Singapore.

Dioscorea pyrifolia, *Kunth*. Batu Caves; Bukit Raja; Kanching; Klang Gates; Sungai Buloh; Weld's Hill. A climber of W. Malaysia; in the Peninsula common in hedges.

Dioscorea stenomeriflora, *Prain and Burkill*. Batu Tiga (Ridley). A slender climber, endemic and rare, Taiping Hills, Singapore.

Dioscorea triphylla, *Linn*. K. Lumpur; Weld's Hill. A climber of Indo-Malaya; in the Peninsula common from Penang and Upper Perak to Singapore.

Dioscorea Zollingeriana, *Kunth*. Batu Caves (Burkill). A climber of Tenasserim, Sumatra and Java; in the Peninsula Perak to Singapore, in forest.

CULTIVATED DIOSCOREACEÆ.

Dioscorea alata, *Linn*. A Yam extensively cultivated in the East, not known in a wild state.

LILIACEÆ.

Peliosanthes albida, *Baker*. Klang Gates (Ridley). A herb of Sumatra and Borneo; in the Peninsula not common in forest, Penang, Perak, Selangor and Malacca.

Peliosanthes violacea, *Wall*. K. Lumpur; Ulu Gombak. A herb of India and Lower Siam; in the Peninsula common in forest.

Dianella ensifolia, *Redoubte*. Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A herb of Indo-Australia and the Mascarene Islands; in the Peninsula common in forest from Setul to Singapore.

Tupistra grandis, *Ridl*. Ulu Gombak (Burkill, Hume). A herb, endemic, not common in forest, Perak and Fraser Hill.

Dracæna aurantiaca, *Wall*. Ulu Gombak (Hume). A shrub of Borneo; in the Peninsula common from the Adang Islands to Singapore.

Dracæna congesta, *Ridl*. Batu Caves (Ridley). A small shrub of Borneo; in the Peninsula Kedah to Mt. Ophir, often on limestone.

Dracæna elliptica, *Thunb*. Batu Caves (Kelsall). A shrub of Indo-Malaya; in the Peninsula common in forest from Kedah to Singapore.

Dracæna Porteri *Baker*. Petaling; Ulu Gombak. A shrub of Siam; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Dracæna singaporensis, *Ridl*. Dusun Tua; Seminyih; Ulu Gombak. A small shrub, endemic, not common in forest, Pahang to Singapore.

Smilax barbata, *Wall.* K. Lumpur (Ridley). A climber of Bangka; in the Peninsula common in open places in the south.

Smilax calophylla, *Wall.* Batang Berjuntai; Bukit Raja; Ulu Gombak. An erect shrub of Sumatra; in the Peninsula common in forest from Kedah to Singapore.

Smilax Helferi, *DC.* K. Lumpur (Ridley). A climber of Tenasserim and Lower Siam in the Peninsula common north of Malacca.

Smilax leucophylla, *Bl.* Sungai Buloh (Ridley). A climber of Indo-China to the Philippines and Moluccas; in the Peninsula Penang to Singapore in forest.

Smilax myosotiflora, *A. DC.* Ulu Gombak (Hume). A slender climber of Lower Siam and Java; in the Peninsula common in forest from Kedah to Singapore.

CULTIVATED LILIACEÆ.

Cordyline terminalis, *Kunth.* ("Dracæna"). Common in gardens. A shrub of India to Polynesia, but often only cultivated, as in the Peninsula.

Gloriosa superba, *Linn.* A herb of Africa, Indo-Malaya and Indo-China; in the Peninsula probably not wild anywhere, but often cultivated.

PONTEDERACEÆ.

Eichornia crassipes, *Solms.* (The "Water Hyacinth"). Ampang; Pudu. An aquatic herb, introduced from Trop. America, and now common in the Peninsula.

COMMELINACEÆ.

Pollia sorzogonensis, *Endl.* Batu Caves; Klang Gates; Ulu Gombak. A herb of Indo-Malaysia and China; in the Peninsula common in forest from Langkawi and Patani to Singapore.

Pollia sumatrana, *Hassk.* Ulu Gombak (Hume). A herb of Sumatra and the Philippines; in the Peninsula rare in forest, Perak.

Pollia thyrsiflora, *Endl.* K. Lumpur; Seminyih; Ulu Gombak. A herb of Tenasserim to New Guinea; in the Peninsula common in forest and near streams from Langkawi to Pulau Tioman.

Commelina clavata, *Clarke.* Batu Caves (Ridley). A creeping herb of India Sumatra and Java; in the Peninsula rare, Ulu Selama (Perak).

Commelina nudiflora, *Linn.* K. Lumpur; Klang Gates; Seminyih; Ulu Gombak. A pantropic herb; in the Peninsula common in waste ground from Penang to Singapore.

Aneilema conspicuum, *Kunth*. Ulu Gombak (Hume). A herb of Burma to Java; in the Peninsula Penang and Kelantan to Malacca, in forest.

Aneilema lineolatum, *Kunth*. Rawang (Ridley). A herb of Indo-Malaya; in the Peninsula common in forest north of Selangor.

Aneilema nudiflorum, *Br.* Rantau Panjang; Seminyih; Ulu Gombak. A herb of S. E. Asia; in the Peninsula common in waste and sandy ground.

Cyanotis capitata, *Clarke*. Batu Caves (Ridley). A creeping herb of India to Japan and New Guinea; in the Peninsula not common in open grassy spots, Upper Perak, Kelantan, Pahang.

Floscopa scandens, *Low*. Klang Gates; Ulu Gombak. A herb of Indo-Australia and China; in the Peninsula common in ditches from Penang and Kelantan to Singapore.

Forrestia gracilis, *Ridl.* Batu Tiga; Rantau Panjang; Seminyih; Sungai Buloh; Ulu Gombak. A herb, endemic, common in forest from Kedah and Kelantan to Singapore.

Forrestia Griffithii, *Clarke*. Klang Gates (Ridley). A herb, endemic, Perak, Malacca, Mt. Ophir, Negri Sembilan, Johore, in forest.

Forrestia irritans, *Ridl.* Seminyih; Ulu Gombak. A herb, endemic, not common in forest, usually montane, Perak to Negri Sembilan.

Forrestia monosperma, *Clarke*. Batu Caves (Ridley). A herb, endemic, not very common in forest, Upper Perak to Selangor.

ALISMACEÆ.

Ranalisma rostrata, *Stapf*. Batu Caves (Ridley). A herb, endemic and local, very rare.

Sagittaria sagittæfolia, *Linn.* Seminyih (Hume 8328, in fr. July). An aquatic herb of China; in the Peninsula cultivated by Chinese as food for pigs, and apparently very rarely flowering.

NAIADACEÆ.

Naias ?minor, *All.* Dusun Tua (Ridley).

FLAGELLARIACEÆ.

Flagellaria indica, *Linn.* K. Lumpur (Ridley, Forest Dept.). A climbing shrub of the tropics of the Old World; in the Peninsula common from Penang to Singapore, chiefly on seashores and in sandy places.

Susum malayanum, *Hook.* Batu Tiga; K. Lumpur; Ulu Gombak. A large herb of Java and Borneo; in the Peninsula common in forest from Penang to Singapore.

PALMÆ.

Pinanga calamifrons, *Becc.* Ulu Gombak (Hume). A small palm of Borneo; in the Peninsula not common, Kedah Peak and Negri Sembilan.

Pinanga disticha, *Bl.* Batu Caves; Petaling; Rawang; Seminyih. A small palm of Lower Siam and Sumatra; in the Peninsula common in forest from Kedah and Kelantan to Singapore.

Pinanga pectinata, *Becc.* Batu Tiga (Ridley). A small palm, endemic, Perak and Johore, in forest.

Pinanga Scortechinii, *Becc.* Ulu Gombak (Hume). A small palm of Lower Siam; in the Peninsula common in forest from Penang and Kelantan to Johore.

Pinanga subintegra, *Ridl.* Ulu Gombak (Hume). A small palm, endemic, not common, Kelantan, Perak, Pahang, Johore, in forest.

Nenga macrocarpa, *Scort.* Ulu Gombak (Hume). A palm, endemic and common in forest from Kedah to Johore.

Iguanura geonomæformis, *Mart.* K. Lumpur (var. *malaccensis*, *Ridl.*); Petaling (var. *malaccensis*); Rawang; Seminyih; Ulu Gombak. A small palm, endemic and common in forest.

Didymosperma hastata, *Becc.* Petaling; Rawang; Sungai Buloh. A small palm, endemic, not common in forest, Perak.

Caryota mitis, *Lour.* Batu Caves; Ulu Gombak. A palm of Indo-Malaya; in the Peninsula Perlis to Singapore, common.

Livistona rupicola, *Ridl.* Batu Caves (Ridley). A palm, endemic and rare on limestone, Langkawi.

Pholidocarpus macrocarpa, *Becc.* Batu Tiga; Petaling. A tall palm, endemic and rare in forest, Perak and the Dindings.

Licuala ferruginea, *Becc.* Batu Caves; K. Lumpur. A small palm of Sumatra; in the Peninsula Kedah, Pahang, Negri Sembilan, Johore, Singapore, common in the south.

Licuala Kingiana, *Becc.* Rantau Panjang (Ridley, Hume). A small palm, endemic and not common in forest, Perak.

Licuala Kunstleri, *Becc.* Ulu Gombak (Hume). A small palm, endemic, not common in forest, Penang, Upper Perak, Kelantan, Perak, Pahang.

Licuala modesta, *Becc.* Seminyih (Hume). A small palm, endemic and rare in forest, Taiping Hills and Kuala Kangsar.

Zalacca conferta, *Griff.* K. Lumpur (Ridley). A shortstemmed palm of Borneo; in the Peninsula common in swamps, Perak and the Dindings to Singapore.

Zalacca glabrescens, *Griff.* K. Lumpur (Ridley). A stemless palm, endemic, Penang, Kelantan, Pahang, Selangor, in forest.

Eugeissonia tristis, *Griff.* K. Lumpur; Ulu Gombak. A large tufted palm of Borneo; in the Peninsula common in forest on the west from Penang to Johore.

Dæmonorops calicarpus, *Mart.* Dusun Tua; ?K. Lumpur. A tufted palm, endemic and common in forest from Penang to Johore.

Dæmonorops carcharodon, *Ridl.* Batu Tiga (Ridley). A climbing palm, endemic and rare, Singapore.

Dæmonorops didymophyllus, *Becc.* Rawang (Ridley). A climbing palm of Borneo; in the Peninsula not uncommon in forest from Penang to Singapore.

Dæmonorops grandis, *Mart.* Batu Tiga (Ridley). A climbing palm, endemic, Kedah Peak to Singapore, common in the south in forest.

Dæmonorops hygrophyllus, *Mart.* Batang Berjuntai; Petaling. A stout climbing palm, endemic, not common, Taiping Hills and Malacca.

Dæmonorops Hystrix, *Mart.* Batu Tiga (Ridley). A climbing palm of W. Malaysia; in the Peninsula common in forest from Penang to Singapore.

Dæmonorops periacanthus, *Miq.* Ulu Gombak (Hume). A stout climbing palm of Sumatra, Bangka and Borneo; in the Peninsula Perak to Singapore, in forest.

Dæmonorops propinquus, *Becc.* K. Lumpur; Seminyih. A climbing palm of Sumatra; in the Peninsula Penang and Upper Perak to Singapore, in forest.

Dæmonorops setigerus, *Ridl.* Ulu Gombak (Ridley). A climbing palm, endemic, Taiping Hills to Singapore, common in forest.

Ceratolobus lævigatus, *Becc.* K. Lumpur; Sungai Buloh. A climbing palm, endemic, Perak, Dindings, Semangkok Pass, Pulau Tioman, in forest.

Calamus castaneus, *Griff.* K. Lumpur; Kuang; Seminyih. A tufted palm, endemic and common in forest from Penang and Upper Perak to Johore.

Calamus ciliaris, *Bl.* Ulu Gombak (Hume). A climbing palm of W. Malaysia; in the Peninsula not very common, Perak and Pahang to Johore.

Calamus conirostris, *Becc.* Weld's Hill (Ridley). A climbing palm, endemic and rare in forest, Gopeng (Perak).

Calamus Curtisii, *Ridl.* K. Lumpur (Curtis). A climbing palm, endemic, not common in forest, Perak and Pahang.

Calamus densiflorus, *Becc.* Batang Berjuntai; K. Lumpur. A climbing palm, endemic, Taiping to Singapore, in forest.

Calamus Diepenhorstii, *Miq.* Selangor, without precise locality (Cantley's collector). A climbing palm of Sumatra and Borneo; in the Peninsula common in forest from Penang to Singapore.

Calamus filipendulus, *Becc.* Rawang (Ridley). A climbing palm, endemic and rare, Perak and Pahang.

Calamus javensis, *Bl.* Batu Caves; Klang Gates; K. Lumpur (the species and var. *purpurascens*, *Ridl.*). A climbing palm of Java and Borneo; in the Peninsula common in forest from Penang and Kelantan to Singapore.

Calamus Lobbianus, *Becc.* Petaling; Ulu Gombak. A short-stemmed palm of Borneo; in the Peninsula Pahang, Negri Sembilan, Johore and Singapore, in forest.

Calamus luridus, *Becc.* Rawang (Ridley). A climbing palm of Borneo; in the Peninsula Taiping to Singapore, in forest.

Calamus neglectus, *Becc.* K. Lumpur (Ridley). A climbing palm, endemic and apparently rare, Malacca.

Calamus perakensis, *Becc.* Ulu Gombak (Hume). A climbing palm, endemic, not common in montane forest, Pahang, Selangor.

Calamus ramosissimus, *Griff.* Seminyih; Ulu Gombak. A climbing palm, endemic, Kedah Peak to Negri Sembilan, in forest.

Calamus scipionum, *Lour.* Batu Tiga; K. Lumpur. A large climbing palm of Sumatra, Borneo and Indo-China; in the Peninsula Perak and Malacca, in forest.

Calamus singaporensis, *Becc.* Seminyih (Hume). A climbing palm, endemic, Penang to Singapore.

Plectocomiopsis dubius, *Becc.* Rantau Panjang (Ridley). A climbing palm, endemic and local.

Plectocomiopsis geminiflorus, *Becc.* Rantau Panjang; Sungai Buloh. A huge climbing palm of Tenasserim, Sumatra and ?Borneo; in the Peninsula not common in forest, Perak.

Korthalsia polystachya, *Mart.* Bukit Tunggal Forest Reserve (Forest Dept.). A climbing palm, endemic, not common in forest, Malacca, Johore and Singapore.

Plectocomia Griffithii, *Becc.* Sungai Buloh (Ridley). A large climbing palm, endemic and common in forest from Penang to Singapore.

CULTIVATED PALMÆ.

Areca catechu, *Linn.* (The Betel-nut Palm). Common in gardens and villages. A tall palm of doubtful origin, cultivated from India to Polynesia.

Arenga saccharifera, *Labill.* (The Sugar Palm). A palm of Indo-Malaya; in the Peninsula widely cultivated, doubtfully wild.

Cocos nucifera, *Linn.* (The Coconut Palm). Commonly cultivated, as it is in all tropical countries.

Cyrtostachys Lakka, *Becc.* (Sealing-wax Palm). Common in gardens. A tufted palm of Borneo; in the Peninsula common on tidal river banks and in swamps.

Elæis guineensis, *Jacq.* (The Oil Palm). A native of Trop. Africa.

Metroxylon sagus, *Rothb.* (The Sago Palm). A tall palm, cultivated throughout Malaya.

Oreodoxa regia, *H. B. K.* (The Royal Palm). Public Gardens, K. Lumpur. A palm of Cuba and Panama; in the Peninsula often cultivated.

PANDANACEÆ.

Pandanus helicopus, *Kurz.* K. Lumpur; Rawang. A tall pandan of Sumatra and Bangka; in the Peninsula not common in rivers, Johore and Singapore.

Pandanus immersus, *Ridl.* Batu Tiga (Ridley). An aquatic pandan, endemic and local, known also from the Labu river, Selangor.

Pandanus ornatus, *Kurz.* Ulu Gombak (Hume). A tall bushy pandan, endemic and common in forest from Kedah to Singapore.

Freycinetia acuminata, *Ridl.* Kuang; Sungai Buloh. A climbing shrub, endemic and rare, known only from these localities.

Freycinetia angustifolia, *Bl.* Ulu Gombak (Hume). A slender climbing shrub of W. Malaysia; in the Peninsula not common in forest, Bukit Hitam (Selangor), Malacca, Johore.

ARACEÆ.

Arisæma Roxburghii, *Kunth.* Batu Caves; Ulu Gombak. A tuberous herb of Java; in the Peninsula Langkawi to Selangor in forest.

Typhonium fultum, *Ridl.* Batu Caves (Ridley). A small herb, endemic and rare on limestone, Langkawi.

Amorphophallus Prainii, *Hook. fil.* Batu Caves (Ridley). A large tuberous herb of Sumatra; in the Peninsula Penang to Pahang and Negri Sembilan, in forest.

Colocasia gigantea, *Hook. fil.* Batu Caves; Ulu Gombak. A large herb of Siam, Indo-China, Java and Borneo; in the Peninsula not common, chiefly on limestone in Perak.

Alocasia denudata, *Engl.* Seminyih; Ulu Gombak. A herb of Lower Siam, Lingga and Borneo; in the Peninsula common from Langkawi to Singapore.

Alocasia Lowii, *Hook. fil.* Batu Caves (Ridley). A herb of Java and Borneo; in the Peninsula Perlis to Johore, often on limestone.

Alocasia ovalifolia, *Ridl.* Batu Caves (Ridley). A herb, endemic, Penang to Johore, in forest.

Aglaonema oblongifolium, *Schott.* Batu Caves; Ulu Gombak. A herb of Lower Siam, Lingga, and Borneo; in the Peninsula common in forest from Langkawi to Singapore.

Aglaonema pictum, *Kunth.* Batu Caves; Dusun Tua (var. *Scortechinii*, *Ridl.*); Klang Gates; K. Lumpur; Ulu Gombak. A herb of Burma and Sumatra; in the Peninsula common in forest from Perak to Singapore.

Homalomena coerulescens, *Jungh.* Bukit Raja; Dusun Tua; Seminyih; Sungai Buloh; Weld's Hill. A herb of W. Malaysia except Borneo; in the Peninsula common in forest from Penang to Singapore.

Homalomena crassa, *Ridl.* Kajang (Ridley). A herb, endemic and rare in forest, known also from Ginting Bidai (Selangor).

Homalomena Griffithii, *Hook. fil.* Ulu Gombak (Hume). A herb of Borneo; in the Peninsula common in forest from Penang to Singapore.

Homalomena humilis, *Hook. fil.* Batu Caves; Klang Gates; K. Lumpur; Petaling; Rantau Panjang; Ulu Gombak. A herb of Sumatra and Borneo; in the Peninsula common in forest from Penang to Selangor.

Homalomena lancifolia, *Hook. fil.* Ulu Gombak (Hume). A herb, endemic, not common in forest, Perak, Pahang and Selangor.

Homalomena purpurascens, *Schott.* Klang Gates (Ridley). A herb of W. Malaysia to the Philippines; in the Peninsula common in forest from Penang to Singapore.

Homalomena rostrata, *Griff.* Batang Berjuntai; K. Lumpur. A herb, endemic, not common in forest, Pahang and Selangor to Johore.

Homalomena Scortechinii, *Hook. fil.* Ulu Gombak (Hume). A herb, endemic, Upper Perak, Perak, Negri Sembilan, in forest.

Schismatoglottis brevicuspis, *Hook. fil.* Petaling (Ridley). A herb, endemic, Penang and Upper Perak to Malacca, in forest.

Schismatoglottis calyptrata, *Zoll. and Mor.* Batu Caves; Petaling; Ulu Gombak. A herb of Indo-Malaya; in the Peninsula common in forest from Penang to Singapore.

Schismatoglottis mutata, *Hook. fil.* Batu Caves (Engler). A herb endemic, not very common Perak and Selangor, often on limestone.

Schismatoglottis Scortechinii, *Hook. fil.* Klang Gates; K. Lumpur; Rawang; Ulu Gombak. A herb, endemic, not common in forest, Perak, Pahang, Johore.

Schismatoglottis Wallichii, *Hook. fil.* Batang Berjuntai; Batu Tiga; Rantau Panjang; Seminyih. A herb, endemic, Province Wellesley and Kelantan to Singapore, in forest.

Piptospatha perakensis, *Ridl.* Klang Gates; Ulu Gombak. A herb, endemic, Perak and Pahang to Malacca, on rocks in streams.

Anadendrum marginatum, *Schott.* Batu Caves; Ulu Gombak. A climbing epiphyte of Sumatra; in the Peninsula not very common in forest, Langkawi to Selangor and Pahang.

Anadendrum montanum, *Schott.* Batu Caves; Batu Tiga; Klang Gates; Sungai Buloh. A climbing epiphyte of Tenasserim to Celebes; in the Peninsula common in forest from Langkawi to Singapore.

Scindapsus hederacea, *Schott.* Batu Caves (Ridley). A shrubby climber of W. Malaysia to the Philippines; in the Peninsula Langkawi to Singapore in forest.

Scindapsus perakensis, *Hook. fil.* Batu Caves (Ridley). A climber of Java and Borneo; in the Peninsula not common in forest, Upper Perak to Malacca.

Epipremnopsis media, *Engl.* Klang Gates (Hume). A climbing shrub of Java, Borneo and the Philippines; in the Peninsula common in forest from Penang to Singapore.

Raphidophora Beccarii, *Engl.* Kuang; Rawang; Ulu Gombak. A climbing shrub of Siam and Borneo; in the Peninsula Penang and Upper Perak to Selangor.

Raphidophora Burkilliana, *Ridl.* Batu Caves (Md. Nur). A climber, endemic and local.

Raphidophora crassifolia, *Hook. fil.* Rawang (Ridley). A climbing shrub, endemic and rare in forest, Taiping and Batang Padang.

Raphidophora Korthalsii, *Schott*, var. *angustiloba*, *Engl.* Batu Caves (Ridley). A climber of Java and Borneo; in the Peninsula common in forest from Penang to Singapore (the species).

Raphidophora Maingayi, *Hook. fil.* Batang Berjuntai; Batu Caves; Seminyih. A climbing shrub, endemic, Malacca, and Singapore (common).

Raphidophora minor, *Hook. fil.* Klang Gates (Hume). A slender climbing shrub of Borneo; in the Peninsula Setul to Singapore, commonest in the south.

Raphidophora pteropoda, *Engl.* Batu Caves (Ridley). A climber of Sumatra and New Guinea; in the Peninsula not common in forest, Penang and Perak.

Raphidophora Wrayi, *Hook. fil.* Batu Caves (Engler). A climber, endemic, Penang, Perak, Pahang, in forest.

Lasia aculeata, *Lour.* Batu Caves; Batu Tiga; Seminyih. A tall herb of Indo-Malaya and Indo-China; in the Peninsula Penang to Singapore in wet places and tidal swamps.

Pothos latifolius, *Hook. fil.* K. Lumpur (Ridley). A climber of W. Malaysia except Borneo; in the Peninsula common in forest from Penang to Singapore.

Pothos lorispatha, *Ridl.* Batu Caves (Ridley). A slender climber, endemic and local.

Pothos scandens, *Linn.* Batu Caves; K. Lumpur. A climbing herb of Indo-Malaya; in the Peninsula Kedah, Penang, Perak and Pahang, in forest.

LEMNACEÆ.

Lemna paucicostata, *Hegelmaier.* K. Lumpur (Burkill). A minute aquatic plant, pantropic; in the Peninsula common in ditches.

Lemna polyrrhiza, *Linn.* Circular Road Plantation, K. Lumpur (Burkill). A cosmopolitan aquatic plant; in the Peninsula not common, Singapore.

Wolffia arrhiza, *Winn.* Circular Road Plantation, K. Lumpur (Burkill). A cosmopolitan aquatic plant; in the Peninsula not common, but abundant where it occurs, Malacca and Singapore.

ERIOCAULACEÆ.

Eriocaulon sexangulare, *Linn.* K. Lumpur; Ulu Gombak. A grasslike herb of Trop. Asia and Madagascar; in the Peninsula common in damp places.

CYPERACEÆ.

Kyllinga brevifolia, *Rottb.* Ampang; Batang Berjuntai; K. Lumpur; Ulu Gombak. A pantropic sedge; in the Peninsula common in waste ground.

Kyllinga melanosperma, *Nees.* Rantau Panjang; Seminyih; Ulu Gombak. A sedge of Africa, India, Java and the Philippines; in the Peninsula not common in grass.

Kyllinga monocephala, *Rottb.* Ampang; K. Lumpur; Seminyih; Ulu Gombak. A pantropic sedge; in the Peninsula common in grass.

Pycnus polystachyus, *Beaur.* Batang Berjuntai; Seminyih; Ulu Gombak. A sedge, pantropic; in the Peninsula common in waste ground.

Cyperus compressus, *Linn.* Klang Gates; Pudu; Ulu Gombak. A tufted sedge, pantropic; in the Peninsula common in waste ground from Penang to Singapore.

Cyperus diffusus, *Vahl.* Batu Caves; Klang Gates; K. Lumpur (the species and var. *pubisquama*, *Ridl.*); Seminyih; Ulu Gombak. A sedge, pantropic; in the Peninsula common from Kedah to Singapore in sandy places.

Cyperus digitatus, *Roxb.* K. Lumpur (Ridley). A tall sedge, pantropic; in the Peninsula common in ditches.

Cyperus distans, *Linn.* Ampang; Batang Berjuntai; K. Lumpur; Ulu Gombak. A sedge, pantropic; in the Peninsula common in wet places.

Cyperus Haspan, *Linn.* Ampang; K. Lumpur; Rantau Panjang; Seminyih; Ulu Gombak. A sedge, pantropic; in the Peninsula common in wet open places.

Cyperus Iria, *Linn.* Ampang; K. Lumpur; Seminyih; Ulu Gombak. A sedge of the tropics of the Old World; in the Peninsula common in ricefields, etc.

Cyperus pilosus, *Vahl.* Ampang; K. Lumpur; Pudu; Rantau Panjang; Seminyih; Ulu Gombak. A sedge of Africa and Trop. Asia to the Philippines; in the Peninsula common in wet places.

Cyperus pulcherrimus, *Willd.* Batu Caves; K. Lumpur. A tufted sedge of India to Java and Borneo; in the Peninsula common in wet places from Perlis to Selangor and Pahang.

Cyperus rotundus, *Linn.* K. Lumpur (Hume). A sedge, pantropic; in the Peninsula common in waste ground.

Cyperus Zollingeri, *Steud.* K. Lumpur (Hume). A sedge of Trop. Africa and Asia to Australia; in the Peninsula common in dry places.

Mariscus cyperinus, *Vahl.* Seminyih; Ulu Gombak. A sedge of Trop. Asia to Polynesia; in the Peninsula common in waste ground.

Mariscus microcephalus, *Presl.* K. Lumpur; Pudu. A tufted sedge of Mauritius and Indo-Malaya; in the Peninsula common near the sea or in damp places.

Mariscus sieberianus, *Nees.* Batu Caves; Kepong; K. Lumpur; Ulu Gombak. A pantropic sedge; in the Peninsula common in waste ground.

Eleocharis chaetaria, *Rœm. & Schultes*. Batang Berjuntai; Klang Gates; K. Lumpur. A small tufted sedge, pantropic; in the Peninsula common in damp places.

Eleocharis ochrostachys, *Steud.* Rantau Panjang (Hume). A tufted sedge of Java and Borneo; in the Peninsula common in wet places.

Fimbristylis asperima *Bæck.* Ampang; Weld's Hill. A sedge of Indo-Malaya; in the Peninsula common in shade.

Fimbristylis diphylla, *Vahl.* Batang Berjuntai; Dusun Tua; Klang Gates; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A pantropic sedge; in the Peninsula common in waste ground.

Fimbristylis ferruginea, *Vahl.*, var. *arvensis*, *Ridl.* Ampang (Hume). A sedge, the species pantropic and common in the Peninsula in tidal mud.

Fimbristylis globulosa, *Kunth.* Rantau Panjang; Seminyih. A sedge of India to Polynesia; in the Peninsula common.

Fimbristylis miliacea, *Vahl.* Ampang; Batang Berjuntai; Seminyih; Ulu Gombak. A tufted sedge, pantropic; in the Peninsula common in damp places.

Fimbristylis schœnoides, *Vahl.* K. Lumpur (Seimund). A sedge of S. E. Asia and Australia; in the Peninsula Penang and Kelantan to Singapore in open places.

Bulbostylis puberula, *Kunth.* Ampang; Ulu Gombak. A small tufted sedge of Indo-Malaya; in the Peninsula not very common in dry sandy places, Penang to Singapore.

Scirpus mucronatus, *Linn.* Ampang; K. Lumpur; Salak South Rd. A tall sedge of S. Europe to Australia; in the Peninsula common in wet places.

Furiena umbellata *Rottb.* K. Lumpur; Pudu; Seminyih; A sedge, pantropic and common in the Peninsula in wet places.

Lipocarpa argentea, *A. Br.* Seminyih (Hume). A sedge of the tropics of the Old World; in the Peninsula common in damp places.

Rhynchospora aurea, *Vahl.* Batang Berjuntai; Batu Tiga; K. Lumpur; Pudu; Seminyih. A tall sedge, pantropic; in the Peninsula common in wet places.

Rhynchospora glauca, *Vahl.* K. Lumpur (Seimund). A sedge, pantropic; in the Peninsula not common in sandy places.

Gahnia tristis, *Nees.* K. Lumpur (Ridley). A large tufted sedge of Borneo and South China; in the Peninsula common in dry places.

Hypolytrum latifolium, *Rich.* Batang Berjuntai; K. Lumpur; Petaling; Seminyih; Ulu Gombak. A tufted sedge of Indo-Australia and China; in the Peninsula common in the lowlands in forest.

Mapania humilis, *Naves & Villar.* Petaling; Ulu Gombak. A sedge of W. Malaysia to the Philippines; in the Peninsula common in forest, Penang to Singapore.

Mapania Kurzii, *Clarke.* Klang Gates; Rantau Panjang. A tufted sedge, endemic, Penang, Perak, Malacca, in forest.

Mapania palustris, *Benth.* Seminyih; Ulu Gombak. A large tufted sedge of ?Java; in the Peninsula common in forest from Upper Perak to Singapore.

Mapania Wallichii, *Clarke.* Batu Tiga (Ridley). A large tufted sedge of Borneo; in the Peninsula not common in forest, Singapore.

Scleria bancana, *Miq.* Batang Berjuntai; K. Lumpur. A sedge of Tenasserim to the Pacific; in the Peninsula common in open places.

Scleria elata, *Thw.* Ulu Gombak (Hume). A sedge of India, Java, Borneo, China and New Guinea; in the Peninsula Penang and Upper Perak to Selangor in forest.

Scleria hebecarpa, *Nees.* Batu Caves; K. Lumpur. A sedge of Indo-Australia, China and Japan; in the Peninsula common in open places from Setul to Singapore.

Scleria lævis, *Retz.* K. Lumpur (Hume). A sedge of Indo-Malaya and China; in the Peninsula common in grass.

Scleria lithosperma, *Sw.* K. Lumpur (Hume). A sedge, pantropic (except Africa); in the Peninsula common in dry places.

Scleria multifoliata, *Bæck.* Seminyih; Ulu Gombak. A sedge of Indo-Malaya; in the Peninsula common in open places.

Scleria radula, *Hance.* Ulu Gombak (Hume). A tall sedge of Hongkong; in the Peninsula not common, usually montane, Penang, Perak, Pahang, Selangor.

Scleria sumatrensis, *Retz.* Batu Tiga; K. Lumpur. A sedge of Indo-Malaya to the Philippines; in the Peninsula common in open places from Penang to Singapore.

GRAMINEÆ.

Imperata arundinacea, *Cyrillo.* (Lallang). Klang Gates; K. Lumpur; Seminyih; and without doubt in all the other localities. A pantropic grass; in the Peninsula common everywhere in open country.

Saccharum arundinaceum, *Reiz.* Batu Caves (Ridley). A tall grass of Indo-Malaya to the Philippines and China; in the Peninsula common from Penang to Singapore, usually on river banks.

Eulalia Milsumi, *Ridl.* Klang Gates (Kloss, Milsum and Ridley). A tufted grass, endemic and local on quartzite rocks.

Ischæmum aristatum, *Linn.* Ampang; Seminyih; Ulu Gombak. A creeping grass of Indo-Australia and China; in the Peninsula very common in waste ground.

Ischæmum Beccarii, *Hack.* Top of the Batu Caves (Ridley). A grass of Borneo; in the Peninsula rare, known only from this locality and from the Botanic Gardens, Singapore.

Ischæmum muticum, *Linn.* Batang Berjuntai; K. Lumpur; and doubtless in most of the other localities. A creeping grass of Indo-Australia; in the Peninsula very common.

Ischæmum rugosum, *Salisb.* Weld's Hill (Burkill). A grass of Indo-Malaya and China; in the Peninsula not common in waste ground.

Ischæmum timorense, *Kunth.* Ulu Gombak (Hume). A grass of India to Polynesia; in the Peninsula common from Penang to Singapore.

Cœlorrhachis glandulosa, *Brongn.* Batu Caves (Ridley). A tall tufted grass of Indo-Australia; in the Peninsula common, often on riverbanks.

Chrysopogon aciculatus, *Trin.* K. Lumpur; Pudu; Ulu Gombak. A grass of Trop. Asia and Australia; in the Peninsula common in dry places.

Themeda villosa, *Durand and Jackson.* Batu Caves; K. Lumpur. A tall grass of Indo-Australia and China; in the Peninsula common in open places.

Digitaria cæspitosa, *Ridl.* Salak South Road (Seimund). A small tufted grass, endemic, Johore and Singapore in open places.

Digitaria chinensis, *Hornem.* Batu Caves (Ridley). A tufted grass of Indo-Malaya and China; in the Peninsula Penang, Perak and Singapore in waste ground.

Digitaria longiflora, *Pers.* Ampang; K. Lumpur; Pudu; Seminyih; Ulu Gombak. A creeping grass of the Tropics of the Old World; in the Peninsula common.

Digitaria marginata, *Link.* Ampang; Batu Caves; K. Lumpur Seminyih; Ulu Gombak. A pantropic grass; in the Peninsula common and variable.

Axonopus compressus, *Beauv.* Bukit Raja; K. Lumpur; Ulu Gombak. A South American grass, introduced into the Peninsula and now established in several localities.

Paspalum Commersonii, *Lam.* Weld's Hill (Md. Nur.). A tufted grass, pantropic, in the Peninsula not common in damp places, Pahang, Negri Sembilan, Singapore.

Paspalum conjugatum, *Berg.* Ampang; Klang Gates; Seminyih; Ulu Gombak; Weld's Hill. A pantropic grass, common in the Peninsula but probably introduced.

Paspalum longifolium, *Roxb.* Salak South Rd.; Weld's Hill. A grass of Indo-Malaya; in the Peninsula not very common in open places, Penang to Singapore.

Brachiaria mutica, *Stapf.* Petaling; Ulu Gombak. A pantropic grass, often cultivated in the Peninsula and occurring as an escape.

Oplismenus compositus, *Beauv.* Batu Caves; Klang Gates; Seminyih. A pantropic grass; in the Peninsula common in dry places from Langkawi to Johore.

Echinochloa colona, *Link.* K. Lumpur; Rawang; Seminyih; Ulu Gombak. A tufted grass, pantropic; in the Peninsula common in waste ground.

Eriochloa annulata, *Kunth.* Petaling (Ridley). A grass, pantropic; in the Peninsula occasional in waste ground.

Panicum auritum, *Presl.* Batu Caves; Batu Tiga; Klang Gates; Seminyih; Ulu Gombak. A tall grass of Indo-Malaya and China; in the Peninsula common in wet places.

Panicum caesium, *Hook.* K. Lumpur (Hume). A grass of Indo-Malaya to the Philippines; in the Peninsula common in open places.

Panicum ovalifolium, *Poir.* Rantau Panjang (Hume). A grass of Africa, Indo-Malaya and China; in the Peninsula common in damp shady places.

Panicum sarmentosum, *Roxb.* Klang Gates; Rawang. A scandent grass of Indo-Malaya and China; in the Peninsula common on forest edges from Setul to Singapore.

Hemigymnia fusca, *Ridl.* Ampang; Batu Caves; Rantau Panjang. A grass of Indo-Malaya; in the Peninsula common.

Acroceras sparsum, *Stapf.* Batu Caves; Klang Gates; Rawang; Seminyih; Ulu Gombak. A creeping grass of Indo-Malaya; in the Peninsula common in open places and secondary growth.

Ichnanthus pallens, *Munro.* Batu Caves (Ridley). A pantropic grass; in the Peninsula not very common in forest, Penang to Johore.

Sacciolepis myosuroides, *Ridl.* Ulu Gombak (Hume). A grass of Trop. Africa and Asia to Trop. Australia; in the Peninsula common from Penang and Kelantan to Singapore in damp places.

Sacciolepis turgida, *Ridl.* K. Lumpur (Burkill). A tufted grass of India and Java; in the Peninsula common in grassy places.

Cyrtococcum accrescens, *Stapp.* Klang Gates; Rantau Panjang; Seminyih; Ulu Gombak; Weld's Hill. A creeping grass of Indo-Malaya to Polynesia and China; in the Peninsula common in shade.

Cyrtococcum carinatum, *Stapp.* Weld's Hill (Burkill). A small creeping grass of Indo-Malaya and Indo-China; in the Peninsula not common in shade, Malacca.

Cyrtococcum oxyphyllum, *Stapp.* Klang Gates; K. Lumpur; Ulu Gombak. A creeping grass of Indo-Australia and the Mascarene Islands; in the Peninsula common in waste ground and by roadsides.

Setaria plicata, *Cooke.* Batu Caves; Dusun Tua; Seminyih; Ulu Gombak. A tall grass of Indo-Malaya and China; in the Peninsula Perak and Kelantan to Johore, not very common.

Setaria rubiginosa, *Beauv.* Batang Berjuntai; Rantau Panjang; Ulu Gombak. A tufted grass of Trop. Asia; in the Peninsula common in waste ground.

Tricholæna rosea, *Nees.* Batu Caves; Klang Gates. A tufted grass of Africa; introduced into the Peninsula about 1901, and now established in Selangor and Negri Sembilan, and in parts of Perak.

Isachne australis, *R. Br.* Ampang; K. Lumpur; Pudu; Seminyih. A grass of Indo-Australia; in the Peninsula common in damp grassy places from Taiping and Trengganu to Singapore.

Isachne semitalis, *Ridl.* Batang Berjuntai; Petaling; Rantau Panjang; Rawang. A creeping grass of Borneo; in the Peninsula not uncommon in wet places.

Eriachne pallescens, *Br.* Klang Gates (Ridley, Foxworthy and Burkill). A grass of Indo-Australia and China; in the Peninsula common in open dry places.

Phragmites communis, *Trin.* K. Lumpur (Ridley). A tall grass of Africa and Trop. Asia to Australia; in the Peninsula common on riverbanks.

Thysanolæna agrostis, *Nees.* Ulu Gombak (Hume). A large tufted grass of India to New Guinea; in the Peninsula Penang to Negri Sembilan, common in dry places.

Sphærocaryum elegans, *Nees*. Batang Berjuntai; K. Lumpur; Ulu Gombak. A small grass of Indo-China; in the Peninsula common in wet places from Taiping to Singapore.

Zoysia pungens, *Willd.* K. Lumpur (Md. Nur). A small grass of the tropics of the Old World; in the Peninsula common in damp places.

Sporolobus diander, *Beauv.* K. Lumpur; Pudu; Seminyih; Ulu Gombak. A grass of Trop. Asia and Australia; in the Peninsula common in dry places.

Sporolobus indicus, *Br.* K. Lumpur; Pudu; Seminyih; Ulu Gombak. A grass, pantropic; in the Peninsula Penang to Singapore in dry places.

Eragrostis amabilis, *Wight & Arn.* Ampang; Batang Berjuntai; K. Lumpur; Pudu; Rantau Panjang; Seminyih; Ulu Gombak. A grass of Trop. Africa and Trop. Asia; in the Peninsula very common in waste ground.

Eragrostis elegantula, *Steud.* Ampang; K. Lumpur; Pudu. A grass of India to S. China, Borneo and the Philippines; in the Peninsula common in damp places.

Eragrostis elongata *Jacq.* K. Lumpur (Hume, Ridley). A grass of Trop. Asia to Australia; in the Peninsula common in waste ground.

Eragrostis malayana, *Stapf.* Ulu Gombak; Weld's Hill. A grass of Bangka and Borneo; in the Peninsula not common in waste ground, Taiping to Singapore.

Eragrostis pilosa, *Beauv.* Batu Caves (Ridley). A pantropic grass, not uncommon in the Peninsula by roadsides.

Eragrostis tenella, *Rœm. & Schultes.* Pudu (Hume). A grass of Trop. Africa and Asia; in the Peninsula common in waste ground.

Cynodon dactylon, *Pers.* K. Lumpur, common. A creeping grass, pantropic; in the Peninsula common in open places.

Eleusine indica, *Gaertn.* Ampang; Klang Gates; Pudu; Seminyih; Ulu Gombak. A grass, pantropic; in the Peninsula very common in waste ground.

Dactyloctenium ægypticum, *Willd.* Ampang; Batu Tiga; K. Lumpur. A grass, pantropic, not very common in the Peninsula in sandy places.

Oryza latifolia, *Desv.* Ampang (Hume). A grass of Trop. America, Africa and Asia; in the Peninsula Kedah, Perak, Johore, in wet places.

Oryza Ridleyi, *Hook. fil.* Kajang Road (Ridley). A grass of Borneo; in the Peninsula in wet places from Perak to Johore.

Leersia hexandra, Sw. Ambang; K. Lumpur. A pan-tropic grass, common in the Peninsula in swamps.

Centotheca lappacea, Desn. Batang Berjuntai; Rantau Panjang; Seminyih; Ulu Gombak. A tall grass of the tropics of the Old World; in Peninsula common in forest.

Lophatherum gracile, Brugn. Batang Berjuntai; Rantau Panjang; Seminyih. A grass of Trop. Asia; in the Peninsula common in forest.

Leptaspis urceolata, Br. Batu Caves; Klang Gates; K. Lumpur; Seminyih. A grass of Indo-Malaya to New Guinea; in the Peninsula common in forest.

Gigantochloa Scortechinii, Gamble. Near Batu Caves (Ridley). A bamboo, endemic, Upper Perak to Selangor and Pahang.

Oxytenanthera sinuata, Gamble. Ulu Gombak (Hume). A slender bamboo of Lower Siam; in the Peninsula not common, Pahang, Negri Sembilan, Johore.

Dendrocalamus pendulus, Ridl. Ulu Gombak (Burkill, Hume). A tall bamboo, endemic, Upper Perak to Negri Sembilan.

Schizostachyum aciculare, Gamble. Batu Tiga; Ulu Gombak. A small bamboo of Sumatra and Borneo; in the Peninsula Dindings, Perak, Pahang, Selangor, Negri Sembilan.

Schizostachyum ?subcordatum, Ridl. Ulu Gombak (Hume 8908).

CULTIVATED GRAMINEÆ.

Bambusa nana, Roxb. Cultivated for hedges. A small bamboo of China and Japan; in the Peninsula extensively cultivated.

Bambusa vulgaris, Schrad. K. Lumpur. A bamboo of India, often cultivated in the Peninsula.

Coix lachrymæ-Jobi, Linn. (Job's tears). K. Lumpur; Serdang Experimental Plantation. A tall grass of Trop. Asia; in the Peninsula commonly cultivated and occurring as an escape.

Cymbopogon citratus, Stapf. (Lemon grass). K. Lumpur; Serdang Experimental Plantation. A tufted grass of uncertain origin, widely cultivated in Indo-Malaya.

Cymbopogon Nardus, Rendle. (Citronella grass). K. Lumpur; Serdang Experimental Plantation. A tufted grass of ? Ceylon, cultivated in Africa, Asia and Australia.

Oryza sativa, Linn. (Rice). A tall grass, native of India, cultivated in the Peninsula as it is in most tropics and subtropics.

Panicum maximum, *Jacq.* (Guinea grass). Cultivated; near Klang Gates (Ridley). A tall grass of Africa; in the Peninsula cultivated for horse fodder.

Saccharum officinarum, *Linn.* (Sugar cane). A tall grass of unknown origin, cultivated in all tropical countries.

Zea Mays, *Linn.* (Maize). A grass of Mexico, cultivated in most temperate and tropical countries.

GNETACEÆ.

Gnetum brunonianum, *Griff.* Klang Gates; Seminyih; Sungai Buloh; Ulu Gombak. A shrub of Tenasserim and Borneo; in the Peninsula common in forest.

Gnetum Kingianum, *Gamble.* Ulu Gombak (Forest Dept.). A liane, endemic, common in forest from Penang to Singapore.

Gnetum longispicum, *Ridl.* Rawang (Ridley). A climber, endemic, not common in forest, Perak, Selangor, Pahang, Johore.

Gnetum tenuifolium, *Ridl.* K. Lumpur (Ridley). A climber of Lower Siam; in the Peninsula common in forest north of Malacca.

CONIFERÆ.

Agathis alba, *Forrworthy.* Ulu Gombak (Hume). A lofty tree of W. Malaysia to the Philippines and Indo-China; in the Peninsula Kedah, Penang, Perak, Pahang.

Podocarpus Blumei, *Endl.* Ampang (Forest Dept.). A tree of Java to New Guinea; in the Peninsula Perak to Singapore, sporadic in forest.

Note: Delete *Digitaria chinensis*, *Hornem.* from the list
Ridley's specimen from Batu Caves is *Cynodon*
dactylon, *Pers.*

INDEX.

Family names in capitals ; generic names in ordinary type ;
common names in italics.

PAGE.	
Abroma—230	
Abrus—240	
Acacia—251, 252	
Acalypha—323	
ACANTHACEÆ—298	
Achras—284	
Acriopsis—336	
Acroceras—357	
Acronychia—234	
Acrotrema—214	
Acryanthus—305	
Acrymia—304	
Actephila—316	
Actinodaphne—312	
Adenia—264	
Adenoncos—213, 334	
Adenosacme—271	
Adenosma—294	
Adenostema—278	
Adina—267	
Adinandra—225	
Adinanthus—250	
Adinobotrys—247	
Aegle—234	
Aeschynanthus—295	
Afzelia—250	
Aganosma—259	
Agathis—361	
Agave—342	
Agclaea—246	
Ageratum—278	
Aglaia—237, 238	
Aglaonema—350	
Agrostistachys—321	
Agrostophyllum—333	
Alangium—267	
Albizia—252	
Aleisanthia—213, 268	
Aleurites—323	
ALISMACEÆ—345	
Allamanda—289	
Allomorpha—259	
Allophylus—242	
Alocasia—350	

PAGE.	
Alphonsea—219	
Alpinia—339	
Alseodaphne—311	
Alsodeia—221	
Alstonia—213, 288	
Alternanthera—305	
Alysicarpus—248	
Alyxia—287	
AMARANTACEÆ—305	
Amaranthus—305	
AMARYLLIDACEÆ—341	
Amomum—338	
Amoora—237	
Amorphophallus—349	
AMPELIDACEÆ—241	
ANACARDIACEÆ—244	
Anacardium—245	
Anadendrum—351	
Ananas—341	
Anaxagorea—217	
Andrachne—316	
Aneilema—345	
Anerincleistus—259	
Angelonia—295	
<i>Angsena</i> —253	
Anisomeles—304	
Anisophyllæa—254	
ANISOPHYLLACEÆ—254	
Anisoptera—227	
Anoctochilus—337	
Anona—219	
ANONACEÆ—215	
Anplectrum—261	
Anthocephalus—267	
Antiaris—327	
Antidesma—318	
Antigonon—306	
Antistrophe—282	
Apama—306	
Aphanamixis—237	
Aphania—243	
Aphyllorchis—336	
APOCYNACEÆ—286	
Aporosa—319	

PAGE.	
Aporuella—299	
Apostasia—341	
APOSTASIACEÆ—341	
Appendicula—336	
Aquilaria—314	
ARACEÆ—349	
Arachis—252	
Aralia—266	
ARALIACEÆ—266	
Aralidium—267	
Archytea—226	
Ardisia—213, 281	
Areca—349	
Arenga—349	
Argostemma—213, 268	
Arisaema—349	
Aristolochia—306	
ARISTOLOCHIACEÆ—306	
Arnotto—228	
Arrow-root—340	
Artabotrys—216, 219	
Arthrophyllum—266	
Artocarpus—327, 329	
Arundina—337	
Arytera—243	
ASCLEPIADACEÆ—290	
Asclepias—290	
Ascochilus—335	
Aspidopterys—233	
Aulocodiscus—271	
Averrhoa—233	
Avocado Pear—313	
Axonopus—357	
Baccaurea—319, 323	
Baekia—255	
Bael fruit—234	
Balanocarpus—228	
Balanophora—315	
BALANOPHORACEÆ—315	
BALSAMINACEÆ—234	
Bambusa—360	
Banana—341	
Barclaya—220	
Barleria—300	
Barringtonia—258	
Bassia—283	
Bauhinia—249, 252	
Beaumontia—289	
Becheria—268	

PAGE.	
Begonia—213, 265	
BEGONIACEÆ—265	
Beilschmiedia—310	
Belimbing—233	
Benincasa—265	
Berrya—232	
Bertholletia—258	
Detel-nut—349	
Bidens—278	
Bignonia—297	
BIGNONIACEÆ—297	
Bixa—228	
BIXACEÆ—228	
Black pepper—308	
Blastus—213, 259	
Blumea—279	
Blumeodendron—323	
Boea—213, 296	
Boehmeria—329	
Bombax—229	
Bonnaya—295	
BORAGINACEÆ—292	
Borreria—213, 277	
Boschia—229	
Bouea—245	
Bougainvillea—305	
Bow-string Hemp—341	
Brachiaria—357	
Brachylophon—233	
Brassiopsis—213, 267	
Brasil-nut—258	
Breadfruit tree—329	
Breynia—317	
Bridelia—315	
BROMELIACEÆ—341	
Bromheadia—334	
Brucea—235	
Brunsfelsia—294	
Buchanania—244	
Bulbophyllum—332	
Bulbostylis—354	
Bullock's Heart—219	
Burmanna—342	
BURMANNIACEÆ—342	
BURSERACEÆ—235	
Butter fruit—285	
Byttneria—230	
CACTACEÆ—266	
Caesalpinia—252	

PAGE.	
Calabash tree—298	
Calamus—347	
Calanthe—333	
Callicarpa—301	
Calophanoides—300	
Calophyllum—224	
CAMPANULACEÆ—280	
Camptandra—338	
Campnosperma—245	
Canarium—219	
Canarium—235	
Candle-nut—323	
Canna—340	
CANNACEÆ—340	
Canscora—292	
Canthium—275	
CAPPARIDACEÆ—220	
Capparis—220	
Capsicum—293	
Carallia—212, 254	
Caranbola—233	
Carica—264	
Caryota—340	
Casearia—263	
Cashew-nut—245	
Cassia—248, 252	
Castanopsis—331	
Castor-oil plant—324	
Casuarina—330	
Cecaya Rubber—324	
CELASTRACEÆ—239	
Celosia—305	
Centotheca—360	
Centrosema—252	
Cephaelis—276	
Ceratolobus—347	
Ceratostylis—333	
Cerbera—289	
Chaillettia—238	
CHAILLETIACEÆ—238	
Champereia—315	
Chasalia—276	
Chaulmoogra—224	
Chaulmoogra, Burmese—224	
Chempaka—215	
Chempaka, white—215	
Chiku—284	
Chilocarpus—286	
Chirita—296	
Chisocheton—236	

PAGE.	
CHLORANTHACEÆ—308	
Chloranthus—308	
Chrysophyllum—283	
Chrysopogon—356	
Cicca—323	
Cinnamomum—311, 313	
Cinnamon—313	
Cissampelos—220	
Citronella grass—360	
Citrulus—265	
Citrus—234	
Claderia—334	
Claoxylon—321	
Cleistanthus—315	
Clerodendron—300, 303	
Clitoria—247	
Clove—258	
Clusia—225	
Cnestis—246	
Cocaine—233	
Coccomelia—253	
"Cock's comb"—305	
Cocoa—231	
Coconut Palm—349	
Cocos—349	
Codiaeum—323	
Coelodiscus—321	
Coelogyne—334	
Coelorrhachis—356	
Coelostegia—229	
Coffea—274, 278	
Coffee—278	
Coix—360	
Cola—231	
Coleus—304	
Colocasia—350	
COMBRETACEÆ—254	
Combretum—255	
Commelina—344	
COMMELINACEÆ—344	
Commersonia—231	
COMPOSITÆ—278	
Congea—303	
CONIFERÆ—361	
CONNARACEÆ—246	
Connarus—246	
Connaropsis—233	
Conocephalus—328	
CONVOLVULACEÆ—292	
Coptosapelta—268	

PAGE.	PAGE.
Corchorus—232	Dendrobium—332
Cordyline—344	Dendrocalamus—360
CORNACEÆ—267	Dendrocolla—336
Corymbis—337	Derris—248
Cosmos—280	Desmodium—248, 252
Costus—338	Desmos—216
Crataeva—220	Dialium—249
Cratoxylon—223	Dianella—343
<i>Creum fruit</i> —289	Didissandra—213, 295
Crepis—280	Didymocarpus—213, 296
Crescentia—292	Didymosperma—346
Crotolaria—247	Digitaria—356, 361
Croton—320, 323	Dillenia—214
Crudia—250	DILLENIACEÆ—214
Crypteronia—262	Dioclea—247
Cryptocarya—213, 310	Dioscorea—342
Ctenolophon—238	DIOSCOREACEÆ—342
<i>Cucumber</i> —265	Diospyros—284, 285
Cucumis—265	Dipladenia—289
Cucurbita—265	Diplanthera—297
CUCURBITACEÆ—264	Diplospora—272
CUPULIFERÆ—330	DIPTEROCARPACEÆ—226
Curanga—294	Dipterocarpus—226
Curculigo—341	Dischidia—291
Curcuma—340	Dissochaeta—260
<i>Custard apple</i> —219	Donax—340
Cyanotis—345	Dracaena—343
Cyathostemma—215	Dracontomelum—245
Cyathula—305	Drepananthus—212, 215
Cymbopogon—360	Dryobalanops—226
Cynodon—359, 361	Drypetes—318
Cynometra—250	Dyera—288
CYPERACEÆ—352	Dysophylla—304
Cyperus—353	Dysoxylum—237
Cypripedium—337	Duranta—303
Cyrtandra—297	<i>Durian</i> —229
Cyrtandromoea—297	Durio—229
Cyrtococcum—358	
Cyrtophyllum—291	EBENACEÆ—284
Cyrtostachys—349	Echinochloa—357
	Eclipta—279
Dactyloctenium—359	Eichhornia—344
Daemonorops—347	Elaeis—349
Dalbergia—247	Elaeocarpus—231
Daphniphyllum—319	Elatariospermum—320
Datura—294	Elatostemma—329
Debregeasia—329	Eleocharis—354
Decaspermum—255	Elephantopus—278
Dehaasia—213, 310	Elettariopsis—339
Delima—214	Eleusine—359

PAGE.	
Ellipanthus—246	
Elytranthe—314	
Embelia—281	
Emilia—279	
Endiandra—311	
Endospermum—323	
Entada—251	
Enterolobium—252	
Epigynum—289	
Epipremnopsis—351	
Eppipinus—321	
Epirhizanthus—221	
Epithema—296	
Eragrostis—359	
Erechthites—279	
Eria—333	
Eriachne—358	
ERICACEÆ—280	
Erigeron—280	
ERIOCAULACEÆ—352	
Eriocaulon—352	
Eriochloa—357	
Eriodendron—229	
Erioglossum—243	
Ervatamia—287, 289	
Erycibe—292	
Eryngium—266	
Erythrina—252	
Erythropsis—230	
Erythroxyton—233	
Eugenissonia—347	
Eugenia—212, 255, 258	
Fulalia—213, 356	
Eulophia—334	
Euonymus—240	
Euphorbia—315, 324	
EUPHORBIACEÆ—315	
Furya—225	
Furycoma—235	
Evodia—234	
Excoecaria—324	
Fagraea—291	
Faradaya—303	
Feronia—235	
FICODEÆ—266	
Ficus—324, 329	
Fimbristylis—354	
Flacourtia—223	
FLACOURTIACEÆ—223	

PAGE.	
Flagelaria—345	
FLAGELLARIACEÆ—345	
Flame of the Forest—253	
Flemingia—247	
Fleurya—328	
Floscopa—345	
Forestia—345	
Frangipanni—289	
Freycinetia—213, 349	
Furcroea—342	
Furiena—354	
Gaertnera—292	
Gahnia—354	
Galearia—213, 320	
Galeola—336	
Garcinia—224, 225	
Gardenia—272, 278	
Gardeniopsis—274	
Gastrochilus—213, 333	
Gendarussa—300	
GENTIANACEÆ—292	
Geophila—276	
GESNERACEÆ—295	
Geunsia—301	
Giant Mimosa—252	
Gigantochloa—360	
Gingelly-oil plant—238	
Ginger—340	
Gironniera—324	
Globba—337	
Glochidion—316	
Gloriosa—341	
Gluta—241	
Glycosmis—234	
Glyptopetalum—240	
GNETACEÆ—361	
Gnetum—361	
Gomphandra—212, 239	
Gomphia—235	
Gomphostemma—304	
Goniothalamus—217	
Gonocaryum—239	
GONOSTYLACEÆ—232	
Gonostylus—232	
Gordonia—226	
Gouania—240	
Gourd—265	
Gourd, bottle—265	
Gourd, wax—265	

PAGE.	
GRAMINEÆ—355	
Grammatophyllum—334	
<i>Guanadilla</i> —264	
Graptophyllum—300	
Greenia—268	
Grewia—231	
<i>Groundnut</i> —252	
<i>Guava</i> —259	
<i>Guinea grass</i> —361	
<i>Gutta Percha</i> —284	
GUTTIFERÆ—224	
Gymnacranthera—309	
Gymnopetalum—264	
Gymnosiphon—342	
Gymnostachyum—299	
Gynandropsis—220	
Gynochthodes—275	
Gynotroches—254	
Gynura—279	
HAEMODORACEÆ—341	
HAMAMELIDACEÆ—254	
<i>Huricot bean</i> —253	
Harmandia—238	
Hedychium—340	
Hedyotis—270	
Helicia—314	
Heliotropium—292	
Hemigymnia—357	
<i>Hemp, Bow-string</i> —341	
<i>Hemp, Manila</i> —341	
<i>Hemp, Mauritius</i> —342	
<i>Hemp, Sisal</i> —342	
<i>Henna</i> —263	
Henslowia—315	
Hernandia—314	
HERNANDIACEÆ—314	
Herpestis—294	
Heterostemma—290	
Hevea—324	
Hibiscus—228, 229	
Hippocratea—240	
Hiptage—233	
Hodgsonia—264	
Holmskioldia—303	
Homalanthus—323	
Homalium—263	
Homalomena—350	
Honckenya—232	
<i>Honolulu creeper</i> —306	

PAGE.	
Hopea—228	
Hornstedtia—338	
Horsfieldia—308	
Hoya—213, 290	
Hullettia—328	
Hunteria—287	
Hydnocarpus—212, 223, 224	
HYDROCHARIDACEÆ—331	
Hydrocotyle—266	
Hygrophila—299	
HYPERICACEÆ—222	
Hypericum—222	
Hypolytrum—355	
Hyptis—303	
Ichnanthus—357	
Icicaster—236	
Iguanura—346	
Ilex—239	
ILICACEÆ—239	
Illigera—314	
Impatiens—212, 234	
Imperata—355	
Indigofera—252	
<i>Ipecachuanha</i> —278	
Ipomoea—293	
IRIDACEÆ—341	
Irvingia—235	
Isachne—358	
Ischnocarpus—288	
Ixonanthes—233	
Ixora—273, 278	
Jacaranda—298	
<i>Jack-fruit</i> —329	
Jackia—273	
Jacobinia—300	
<i>Jambu</i> —258	
<i>Jambu ayer</i> —258	
Jasminum—286	
Jatropha—324	
<i>Job's tears</i> —360	
<i>Jujube</i> —240	
Jussiaea—263	
Justicia—213, 300	
<i>Jute</i> —232	
Kæmpferia—340	
<i>Kapok</i> —229	
Kayea—225	

PAGE.	PAGE.
Kibara—310	Limnanthemum—292
Knema—309	Limnophila—294
<i>Kola nut</i> —231	LINACEÆ—232
Koompassia—249	Lindera—313
Kopsia—287	Linociera—213, 286
Korthalsia—348	Liparis—332
Kurrimia—240	Liphocarpa—354
<i>Kwini</i> —246	Lippia—301
Kyllinga—352	Litsea—312
	Livistona—346
LABIATÆ—303	Lobelia—280
Labisia—281	LOBELIACEÆ—280
Lactuca—280	Lochnera—289
<i>Lady's fingers</i> —229	LOGANIACEÆ—291
Lagenaria—265	Longetia—318
Lagerstroemia—262	<i>Loofa</i> —265
<i>Lallang</i> —355	Lophatherum—360
Lansium—238	Lophopetalum—240
Lantana—301	Lophopyxis—239
Laportea—328	LORANTHACEÆ—314
Lasia—352	Loranthus—314
Lasianthus—276	LOWIACEÆ—340
LAURACEÆ—310	Loxanthera—314
Lawsonia—263	Lucinaea—270
Lecananthus—271	Lucuma—283
Lecanorchis—336	Ludwigia—263
Leea—242	Luffa—265
Leersia—360	LYTHRACEÆ—262
LEGNOTIDACEÆ—254	
LEGUMINOSÆ—246	Macaranga—213, 322
Lemna—352	Madhuca—283
LEMNACEÆ—352	Maesa—281
<i>Lemon grass</i> —360	MAGNOLIACEÆ—215
LENTIBULARIACEÆ—295	<i>Maize</i> —361
Leonurus—304	Mallotus—321
Lepidagathis—299	Malpighia—233
Lepionurus—315	MALPIGHIACEÆ—233
Lepisanthes—243	MALVACEÆ—228
Lepistemon—293	Mangifera—244, 246
Leptaspis—360	<i>Mango</i> —246
Leptonychia—231	<i>Mangosteen</i> —225
Lettsomia—292	Manihot—324
Leucaena—251	<i>Manila hemp</i> —341
Leucas—304	Mapania—355
Leuconotis—287	Maranta—340
Leucostegane—250	MARANTACEÆ—340
Licuala—346	Mariscus—353
LILIACEÆ—343	Marsdenia—290
Limacia—220	Marumia—260
<i>Lime</i> —235	Matthaea—310

PAGE.	
<i>Mauritius hemp</i> —342	
Medinilla—261	
Melaleuca—255	
Meianochyla—245	
Melanolepis—321	
Melanorrhoea—244	
Melastoma—259	
MELASTOMATACEÆ—259	
Melha—238	
MELIACEÆ—236	
Meliosma—244	
Melochia—230	
Melodorum—218	
Melothria—264	
Memecylon—261	
MENISPERMACEÆ—219	
Mentha—304	
Merremia—293	
Merrillia—234	
Mesua—225	
Metroxylon—349	
Mezoneuron—250	
Mezzettia—219	
Michelia—215	
Microchites—289	
Microdesmis—320	
Micromelum—234	
Microsaccus—335	
Microstemon—245	
Microtropis—239	
Millettia—247	
Mimosa—251, 252	
Minusops—284	
Mischocarpus—243	
Mitragyne—267	
Mitrephora—218	
Mollugo—266	
Momordica—264	
MONIMIACEÆ—310	
Monophyllaea—296	
Morinda—274	
Morus—330	
Mucuna—247	
Mulberry—330	
Muntingia—231	
Murraya—235	
Musa—340	
MUSACEÆ—340	
Mussaenda—271, 278	
Mycetia—271	

PAGE.	
Myristica—309, 310	
MYRISTICACEÆ—308	
MYRSINACEÆ—231	
Myrsine—281	
MYRTACEÆ—255	
NAIADACEÆ—345	
Naias—345	
Napeodendron—212, 243	
Naravelia—214	
Nauclea—267	
Neesia—229	
Nenga—346	
Neolitsea—313	
Neonauclea—267	
<i>Nepal trumpet flower</i> —289	
NEPENTHACEÆ—306	
Nepenthes—306	
Nephelium—243, 244	
Nerium—289	
Neuropeltis—293	
Nicotianum—294	
Norrisia—291	
Nothaphoebe—311	
<i>Nutmeg</i> —310	
NYCTAGINACEÆ—305	
NYMPHÆACEÆ—220	
Oberonia—213, 331	
Ochanostachys—238	
Ochna—235	
OCHNACEÆ—235	
Ochrosia—289	
Ochthocharis—259	
Ocimum—304	
<i>Oil palm</i> —349	
OLACACEÆ—238	
Oldenlandia—270	
Olea—286	
OLEACEÆ—286	
ONAGRACEÆ—263	
Ophiorrhiza—213, 269	
OPILIACEÆ—315	
Oplismenus—357	
Opuntia—266	
<i>Orange</i> —234	
ORCHIDACEÆ—331	
Orchidantha—340	
Oreodoxa—349	
Ormosia—248	

PAGE.

Orophea—217
 Oroxylum—297
 Oryza—359, 360
 Osmelia—263
 Otophora—243
 Ottelia—331
 OXALIDACEÆ—233
 Oxalis—233
 Cxymitra—218
 Oxytenanthera—360

 Pachychlamys—228
 Pachynocarpus—228
 Paederia—277
 Palaquium—283, 284
 PALMÆ—346
 PANDANACEÆ—349
 Pandanus—213, 349
 Pangium—223
 Panicum—357, 361
 Papaya—264
 Paphiopedilum—337
 Parameria—288
 Parkia—252
 Paropsia—264
 Pasania—330
 Paspalum—357
 Passiflora—263, 264
 PASSIFLORACEÆ—263
 Patchouli—305
 Pavetta—213, 273
 Payena—283, 284
 PEDALINACEÆ—298
 Peliosanthes—343
 Pellacalyx—254
 Pellionia—329
 Peltophorum—253
 Pentace—231
 Pentaphragma—280
 Pentasacme—290
 Pentaspadon—245
 Peperomia—306
 Pergularia—290
 Pericampylus—220
 Peristrophe—300
 Peronema—303
 Persea—313
 Petunga—272
 Phaeanthus—219
 Phaeomeria—339

PAGE.

Phaius—334
 Phaseolus—253
 Phaulanthus—259
 Phoebe—311
 Pholidocarpus—346
 Pholidota—334
 Phragmites—358
 Phreatia—333
 Phrynium—340
 Phyllagathis—260
 Phyllanthus—213, 316
 Physalis—293
 Phytocrene—239
 Pigeon orchid—332
 Pilea—328
 Pimelodendron—323
 Pinanga—346
 Pineapple—341
 Piper—307
 PIPERACEÆ—306
 Piptospatha—351
 Pipturus—329
 Pithecolobium—251, 253
 PITTOSPOREACEÆ—221
 Pittosporum—221
 Plagiostachys—339
 PLANTAGINEACEÆ—281
 Plantago—281
 Plantain—341
 Platyclinis—332
 Plectocomia—348
 Plectocomiopsis—213, 348
 Plocoglottis—334
 PLUMBAGINACEÆ—280
 Plumbago—280
 Plumiera—289
 Podocarpus—361
 Pogonanthus—261
 Pogostemon—304, 305
 Poinciana—253
 Poinsettia—324
 Polia—344
 Polyalthia—212, 216, 219
 Polygala—221
 POLYGALACEÆ—221
 POLYGONACEÆ—305
 Polygonum—305
 Polyosma—254
 Polytrema—300
 Pometia—243

PAGE.	
Pongamia—247	
PONTEDERIAÆ—344	
Popowia—218	
Porana—293	
Portulaca—222	
PORTULACACEÆ—222	
Pothos—213, 352	
Pottsia—288	
Pouzolzia—329	
Premna—301	
Preptanthe—334	
<i>Pride of India</i> —262	
Procris—329	
PROTEACEÆ—314	
Pseuderanthemum—213, 299	
Pseudo-eugenia—258	
Psidium—259	
Psychotria—213, 275, 278	
Pterisanthes—242	
Pternandra—261	
Pterocarpus—253	
Pterocymbium—230	
Pterospermum—230	
Ptychopyxis—322	
Ptyssiglottis—213, 300	
Pueraria—247	
<i>Pulasan</i> —244	
<i>Pumelo</i> —234	
<i>Pumpkin</i> —265	
<i>Purging nut</i> —324	
Pycreus—353	
Pygeum—253	
Pyrenaria—226	
Quamoclit—293	
Quisqualis—255	
Radermachera—297	
<i>Rain tree</i> —252	
<i>Rambutan</i> —244	
<i>Ramie</i> —329	
Ranalisma—213, 345	
Randia—272	
RANUNCULACEÆ—214	
Raphidophora—213, 351	
Rauwolfia—287	
Ravenala—341	
Rennellia—275	
RHAMNACEÆ—240	
Rhodamnia—255	

PAGE.	
Rhododendron—280	
Rhodoleia—254	
Rhodomyrtus—255	
Rhyncospora—354	
<i>Rice</i> —360	
Ricinus—324	
ROSACEÆ—253	
<i>Roselle</i> —229	
Roucheria—232	
Roupellia—289	
Rourea—246	
Roureopsis—246	
<i>Royal palm</i> —349	
<i>Rubber</i> —324	
RUBIACEÆ—267	
Rubus—253	
Ruellia—299	
RUTACEÆ—234	
Ryparosa—223	
SABIACEÆ—244	
Saccharum—356, 361	
Sacciolepis—358	
Saccolabium—213, 335	
Sagittaria—345	
<i>Sago palm</i> —349	
Salacia—240	
SALICINACEÆ—331	
Salix—331	
Salomonina—221	
Salvia—305	
SAMYDACEÆ—263	
Sanchezia—300	
Sansevieria—341	
SANTALACEÆ—315	
Santiria—236	
SAPINDACEÆ—242	
Sapium—323	
SAPOTACEÆ—283	
Saprosma—277	
Saraca—250	
Sarcochilus—335	
Saurauia—226	
Sauropus—213, 318	
SAXIFRAGACEÆ—254	
Scaphium—230	
Scaphocalyx—223	
Schefflera—266	
Schismatoglottis—351	
Schizostachyum—360	
Scindapsus—351	

PAGE.	
Scirpus—354	
Scleria—355	
Scoparia—295	
SCROPULARIACEÆ—294	
<i>Sealing-wax palm</i> —349	
Semecarpus—245	
<i>Sensitive plant</i> —349	
Sesamum—298	
Setaria—358	
Shorea—227	
Sida—228	
Sideroxylon—283	
SIMARUBACEÆ—235	
Sindora—250	
<i>Sisal hemp</i> —342	
Sloetia—324	
Smilax—344	
SOLANACEÆ—293	
Solanum—293	
Sonerila—213, 259	
<i>Soursop</i> —219	
Sparganophorus—278	
Spathodea—298	
Spathoglottis—333	
Spermacoe—278	
Sphaerocaryum—359	
Sphenodesme—303	
Sporolobus—359	
Stachyphrynium—340	
Stachytarpheta—301, 303	
STAPHYLACEÆ—244	
Staurogyne—297	
Staurogyne—298	
Stemonurus—239	
Stenomeris—342	
Stephania—220	
Sterculia—229	
STERCULIACEÆ—229	
Stereospermum—298	
Striga—295	
Strombosia—238	
Strophanthus—288, 289	
Strychnos—291	
Stylocoryna—274	
STYRACACEÆ—285	
Styrax—285	
<i>Sugar cane</i> —361	
<i>Sugar palm</i> —349	
Susum—345	
Symplocos—285	

PAGE.	
Synedrella—279	
<i>Sweet potato</i> —293	
Swintonia—244	
Tacca—342	
TACCACEÆ—342	
Taeniophyllum—335	
Talauma—215	
<i>Tamarind</i> —253	
Tamarindus—253	
<i>Tapioca</i> —324	
Taraktogenos—223, 224	
Tarenna—213, 273	
Tarrietia—230	
<i>Teak</i> —303	
Tectona—303	
Tephrosia—247	
Terminalia—254, 255	
TERNSTROEMIACEÆ—225	
Tetracera—214	
Thelasis—336	
Themeda—356	
Theobroma—231	
Thismia—342	
Thottea—306	
Thrixspermum—213, 335	
Thunbergia—298, 301	
THYMELACEÆ—314	
Thysanolaena—358	
TILIACEÆ—231	
Timonius—274	
Tinomisium—219	
Tinospora—220	
<i>Tobacco</i> —294	
Torenia—294	
Tournefortia—292	
Toxocarpus—290	
<i>Travellers' palm</i> —341	
Trema—324	
Trevesia—266	
Trichoglottis—335	
Tricholaena—358	
Trichosanthes—264	
Trichotosia—333	
Trigoniasstrum—222	
Trigonostemon—213, 321	
Trimezia—341	
Triomma—235	
Triphasia—235	
Tristellateia—233	

PAGE.	PAGE.
Tropidia—337	Villebrunea—329
Tupistra—343	VIOLACEÆ—221
<i>Turmeric</i> —340	Vitex—302
Turnera—263	Vitis—241
TURNERACEÆ—263	Vrydagzynea—337
Turpinia—244	
Turraea—236	Walsura—238
Tylophora—290	" <i>Water Hyacinth</i> "—344
Typhonium—349	<i>Water-melon</i> —265
	Wikstroemia—314
UMBELLIFERÆ—266	Willughbeia—286
Uncaria—267	Wolfia—352
Uraria—248	Wood Apple—235
Urceola—288	Wormia—214
Urena—228	Wrightia—288
Urophyllum—213, 271	
URTICACEÆ—324	Xanthophyllum—222
Utricularia—295	Xerospermum—243
Uvaria—215	Xylopia—219
VACCINIACEÆ—280	Yam—343
Vaccinium—280	
Vallaris—288	Zalacca—347
Vanda—337	Zanonia—265
Vandellia—294	Zea—361
Vanilla—337	Zeuxine—337
Vatica—228	Zingiber—338, 340
Ventilago—240	ZINGIBERACEÆ—337
VERBENACEÆ—301	Zizyphus—240
Vernonia—279	Zoysia—359
Vigna—247	

THE GARDENS' BULLETIN STRAITS SETTLEMENTS

Vol. IV.

Nos. 11 & 12.

ON SOME FERNS FROM THE MALAY PENINSULA

By Carl Christensen, Copenhagen, Denmark.

From Mr. R. E. Holttum, Director of the Botanic Gardens, Singapore, I have received in 1926 and 1927 two lots of duplicate specimens of ferns from the Peninsula. The specimens were of extraordinary interest to me, because I am now engaged in the determination of three very large collections of ferns from Borneo, in connection with a critical revision of the whole fern-flora of that large island, based on examination of type specimens received on loan from the leading herbaria in Europe and America. It soon became clear to me that the fern floras of Borneo and the Malay Peninsula are very intimately related, having a very large number of species in common. I found that some of the specimens from the Peninsula so kindly sent by Mr. Holttum were perfectly identical with others from Borneo, but in not a few cases different names were given to them.

In July 1926 Mr. H. N. Ridley published his large paper, "The Ferns of the Malay Peninsula" (*Journ. Malayan Branch, R. Asiatic Soc.*, 4, part 1), which work I have studied with considerable interest. It appears that Mr. Ridley has identified the great majority of his specimens at Kew, and has in several cases without criticism adopted Beddome's species. All modern pteridologists agree in taking the species in a narrower sense than Baker and Beddome, and to me several of Ridley's species are an assemblage of a number of most distinct forms. On the other hand he has adopted some of the species recently described by van Alderwerelt van Rosenburgh, who has described an immense number of new species which are scarcely all well founded, and not rarely identical with species previously described. Unfortunately a large number of his new species are not represented by authentic specimens in European herbaria, even not in Leiden. and without examination of such specimens it is in most cases rather impossible to know whether his species are valid ones or not.

As a certain number of the species adopted by Mr. Ridley were unknown to me, and others seemed to be wrongly

named, I asked Mr. Holttum to send me on loan specimens of those species from the Singapore Botanic Gardens Herbarium, and very kindly he did so.

Having thus had specimens of most species enumerated in Mr. Ridley's list, and having compared them with an immense quantity of material from Borneo and with numerous type specimens, I have been able to verify the determinations, or in several cases give the species their right names. In the present paper a part of my critical remarks are published. It contains descriptions of a couple of new species, the first record of several species for the Peninsula, and a revision of some groups of closely related species.

Copenhagen, March 4th, 1928.

Hymenophyllum productum Kunze, Bot. Zeit., 1848, 305; v. d. Bosch, Hym. Jav., 56, pl. 45.

H. demissum Ridley p. 12 (pro parte?).

PERAK: Taiping Hill (Burkill 12836). PAHANG: G. Kajang, P. Tioman (Henderson 18604).

The distinct species has by most authors been considered a "form" of the Australian *H. demissum*; it differs from that species by its smaller size, more open habit and especially by the slightly but distinctly crenately toothed tips of the indusium valves. It is apparently a common species through the Malayan region.

Hymenophyllum semifissum Copeland, Philipp. Journ. Sci., 10 C, 145. 1915.

JOHORE: Gunong Panti (Holttum 18066).

Determined rightly by Mr. Holttum. The species, previously known from Borneo only, seems to be very distinct by its subdimidiate pinnae with long linear entire secondary segments, by the few but long brown hairs on the rachis and the subtrichomanoid sori, the indusia cut half-way down only with two acute valves and a long exserted receptacle. It seems to be rather common in Sarawak, and may be confounded with two other species also common there, viz. *H. Bakeri* Copel. (*Trichomanes denticulatum* Bak.) and *H. microchilum* (Bak.) C. Chr. comb. nov. (*Trichomanes* Bak.). The former differs by the serrated segments, the latter especially by the indusia very slightly cleft with two small valves and lack of hairs. Both were referred by Baker to *Trichomanes*, but the whole habit agrees much better with *Hymenophyllum*; within this genus the three species form a special little group. The two Bornean species probably occur also in the Peninsula.

Hymenophyllum tunbridgense (L.) Sm.

To this species Ridley (p. 13) refers two specimens, not seen by me; a third from Pahang (Henderson 18275) and so named by Holttum is certainly not *H. tunbridgense*, but a form of the very variable *H. holochilum*, near var. *affine*

(v. d. B.). I do not believe that the true *H. tunbridgense* occurs in the Malayan region.

***Trichomanes sublimbatum* K. Muell.**

Specimens from Singapore (Bukit Timah), leg. Holttum (10481) and by him named *T. sublimbatum*, agree with the specimen from the same locality (Ridley 6684) which Ridley, p. 15, referred to *T. Henzaianum* Parish. It is a proportionally large form (leaves 2-3 cm. long), deeply pinnatifid with about 4 linear oblong lobes on each side, in habit recalling the American *T. montanum* Hook. Spurious veins many, as in *T. sublimbatum* (cf. v. d. Bosch: Hym. Jav. pl.2) but connected by an intramarginal continuous spurious vein, which is not found in the genuine *T. sublimbatum*. The determination is therefore not certain, but it is not, I think, *T. Henzaianum* Parish, known by me from Hooker's illustration (Cent. pl. 1) and certainly it is not a variety of *T. Motleyi*, as suggested by Ridley. Holttum's collection (no. 10481) contains several smaller fronds which no doubt are typical *T. sublimbatum* with entire or slightly lobed blades, without intramarginal vein, and mixed with them several others of the larger, pinnatifid form. It is probable that these two forms are states of one species, and may possibly be formed on the same rhizome, which I have not, however, observed, so I am not sure. If this hypothesis is wrong, I should be inclined to consider the larger, pinnatifid form an undescribed species. I have it also from Sumatra and Borneo.

***Trichomanes humile* Forst., Prod., 84.**

Crepidomanes humile v. d. Bosch, Hym. Jav., 16, pl. 11.

Trichomanes pyxidiferum pro parte, Ridley, p. 18.

SINGAPORE: Bukit Timah (Holttum 10482).

Easily distinguished from *T. bipunctatum* and the two following species by the presence of a marginal spurious vein, and by its thin texture.

***Trichomanes brevipes* (Pr.) Baker, Syn. Fil., 84. 1867.**

Didymoglossum brevipes Presl, Hymenoph., 23, 47. 1843.

Trichomanes melanorhizon Hook., Spec., 1, 140.

1846. Ic. Plant., pl. 705.

Trichomanes recedens Rosenstock, Meded. Rijks Herb. Leiden, no. 11, 2. 1912.

Trichomanes microlirion Copeland, Philipp. Journ. Sci., 10 C, 146. 1915.

Trichomanes pyxidiferum pro parte, Ridley, p. 18.

SINGAPORE: (Ridley.) JOHORE: (Ridley 13473).

A beautiful series of specimens from Borneo, with which these from the Malay Peninsula fully agree, have convinced me that *T. brevipes* is a distinct species, different

from *T. bilabiatum*, to which it has been referred (see Ind. Fil.) and therefore forgotten and in recent time redescribed as a new species by Rosenstock and Copeland. It differs from *T. bilabiatum* by its light green colour, by the presence of several short reddish hairs on rachis and ribs beneath, by the short spurious veins in the parenchyma within the submarginal one being very few or none, by the sori being confined to the axils of the uppermost pinnae, which often are very much reduced so that the sori sometimes form a spike at the top of the frond, and by the valves of the indusia being short, rounded, and at maturity reflexed. *T. pyridiferum* Ridley is partly this species, partly probably *T. bilabiatum* and *T. humile*. The genuine *T. pyridiferum* L. is a West Indian species not found in the Old World.

Trichomanes bilabiatum Nees et Bl., Nova Acta, 11, 123, Pl. 13, fig. 2. 1823.

Didymoglossum laxum v. d. Bosch, Hym. Jav., 37, pl. 27.

I have seen no specimen of this species from the Malay Peninsula, but as it occurs in most of the Malayan Islands it certainly also may be found in the Peninsula. In habit it resembles the former species; it is dark green, not so conspicuously hairy, spurious short veins in the parenchyma numerous, and the sori not confined to the axils of the upper pinnae, several of the outer segments being often soriferous, the valves of the indusium longer.

Trichomanes setaceum v. d. Bosch, Nederl. Kruidk. Arch., 5 (2), 176. 1861.

Tr. setigerum Backh., Cat. 14. 1861 (not seen). Moore, Gard. Chron., 1862, 45, sp. auth., Kew!

Tr. parviflorum auctt.; Ridley 20, not Poir.

Most specimens from Tropical Asia hitherto named *T. parviflorum* (or *T. fœniculaceum* Bory) belong, I think, to *T. setaceum* v. d. B. described from a specimen from Singapore. It seems to be common in Borneo and may easily be known from the other species of the section Leptomanes by the ultimate filiform segments being connate below, forming an undivided basal portion of the ultimate pinnules. The true *T. parviflorum* from the Mascarene Islands has, as *T. pluma* and *T. meifolium*, the ultimate pinnules cut to the midrib into filiform, terete segments, the midribs of which are bordered by 1-3 rows of clear parenchymatous cells, much as in *T. gemmatum*. The only specimen by Ridley referred *T. parviflorum* (leg. Murton) is to me *T. setaceum*. He cites this name as a synonym of *T. cupressoides* Desv., which differs by its somewhat crisped fronds and the secondary pinnules not being dissolved into filiform segments, the ultimate veins being connate nearly to the apex.

Alsophila Burbidgei Baker, Journ. Bot., 1879, 38.

? *A. trichodesma* Scort., Bedd., Journ. Bot., 1887, 321.

Cyathea mollis Copel., Philipp. Journ. Sci., 12 C, 52, 1917.

PERAK: Bujang Malacca (Herb. Bot. Gard. Singapore, probably coll. Wray, s. n.; *A. trichodesma*). NEGRI SEMBILAN: Bukit Tangga (Md. Nur, 11830).

The name *A. Burbidgei* was applied by Bishop Hose and Dr. Christ to a Bornean species, which differs from the true *A. Burbidgei*, from Sarawak (Burbidge, Kew!) by the densely squamose stipe and rachis; it is, I believe, very nearly the same as *A. Margaretthae* Schwet. These large tree ferns are usually very difficult to identify because most material in the herbaria is fragmentary; this is the case with the type specimens of *A. Burbidgei* and *A. Margaretthae* (Herb. Bonaparte, Paris).

The genuine *A. Burbidgei*, of which the stipe is unknown to me, is a rather thin-leaved species with dark brown or atropurpureous main rachis which shows no traces of scales but is minutely scabious from fallen hairs, above densely and adpressedly pubescent. All its ribs beneath densely hirsute by patent, rather soft, pluricellular hairs, the costules with some few lanceolate brown scales and the midribs of segments with a few whitish bullate scales beneath. The pinnules are very shortly petiolulate, the segments subentire or crenate; sporangia mixed with some long hairs.

The specimen from Negri Sembilan resembles very closely Baker's type, and the specimen from Perak, supposed to be *A. trichodesma* Scort. is very nearly the same; its rachis is lighter and still pubescent beneath, the pinnules sessile, the segments distinctly crenately toothed, the hairs stiffer, cylindrical, subulate, distinctly septate, very much like those of *A. margarethae*, but all these differences seem scarcely sufficient for the segregation of this form as a distinct species. According to Beddome its stipe is scaly at base only. *Cyathea mollis* Copel. from British North Borneo (Sandakan, Mrs. Clemens 9440, Herb. Copeland!) is, I firmly believe, a less pubescent form of the same species.

Dryopteris pectiniformis n. sp.

Lastrea. Rhizome probably erect. Stipe stramineous, shortly puberulous. Lamina ovate-elongate, acuminate, herbaceous, 45 cm. long, 22 cm. wide, bipinnatifid. Rachis densely but very shortly pubescent. Pinnae about 20 pairs, sessile, the lower opposite, the upper alternate, acuminate, the lower not reduced, the largest 11 cm. long, 1.8 cm. wide, at distances of about 3.5 cm., patent, very regularly pectinato-pinnatifid to a wing 1 mm. broad. Segments a little oblique, separated by narrow sinuses, the basal ones of lower

pinnae reduced, the upper basal one of upper pinnae somewhat enlarged, medial ones oblong, acute, entire, 2mm. broad Costae densely grayhairy on both sides, midribs and veins sparsely pubescent, the underside densely glandular with red, shining glands. Veins 7-8 jugate, simple. Sori medial or a little inframedial, indusia large, rufous, persistent, glabrous.

PERAK: without definite locality, leg. Bishop Hose. (Type in Herb. Roland Bonaparte, Mus. d'Hist. Nat. Paris).

The specimen was distributed as *Nephrodium gracilescens*, and it was probably collected in the Taiping Hills; other specimens from the same collection (Hose 293 ?) were referred to that species by Ridley, p. 64. It differs from *D. gracilescens* by larger size, finely glandular underside, more densely and more shortly pubescent rachis and costae, the large rufous-brown indusia, etc. The true *D. gracilescens* (Bl.) from Java is eglandulose, has obtuse segments, supramedial sori, and is as a whole much smaller. A specimen from Perak, leg. Scortechini, referred by Ridley to *D. gracilescens*, belongs rather to *D. pectiniformis*, agreeing with the type in the acute segments and large indusia, but it is without glands.

Dryopteris viscosa (J. Sm.) O. Kze.; C. Chr., Index.

Lastrea viscosa J. Sm., Ridley 65.

Nephrodium gymnopodium Baker, Trans. Linn. Soc., II S, Bot., 4, 252.

Dryopteris gymnopoda C. Chr., Index.

Lastrea Ridleyi Bedd., Kew Bull., 1909, 423. Ridley 65.

Dryopteris Ridleyi C. Chr., Ind. Suppl., 38, 1913.

Dryopteris athyriocarpa Copeland, Philipp. Journ. Sci., 3 C, 344. 1909.

Dryopteris kinabaluensis Copel., l. c., 12 C, 55. 1917.

Having seen the type specimens of all these "species" described as new in recent time, I am fully convinced that they all must be referred to the old *D. viscosa*. They are all fully identical as to all important characters; the dark stipe, dark colour, more or less glandular surfaces, the reflexed basal pinnae, venation, etc., varying somewhat in indusium-characters and density of the glands. These are as a rule dark-brown, like drops of gum, and may be found on both surfaces, but evidently they soon dry out and are then scarcely perceptible. The indusia are generally persistent, reniform or sub-hippocrepiform with a deep sinus, rarely small as in a cotype specimen of *L. Ridleyi* Bedd. (Ridley 7849), which was described as exindusiate; it is identical with *N. gymnopodium* Bak. from Mt. Kinabalu, British N. Borneo (Haviland 1486, Kew!). *D. kinabaluensis* Copel. from the same mountain (Topping 1719, Herb.

Copeland!) is quite the same. *D. athyriocarpa* Copel. from Sarawak, Bongo Range (Brooks and Hewitt, Herb. Copeland!) is a somewhat different form, evidently common in Borneo, with subathyrioid indusia and the upper basal segment lobed. Other forms occur in Sumatra; the whole complex of forms is closely allied to *D. gracilescens*. Intimately allied to *D. viscosa* is

Dryopteris Robinsonii (Ridley) C. Chr. comb. nov.

Lastrea Robinsoni Ridley, 65.

In general habit and colour it does not differ from *L. viscosa*, but its pubescence is peculiar and it seems to be distinct. The whole leaf is densely glanduloso-pubescent with short hairs, those of the rachis and costae longer and reddish. The surfaces are densely dotted with small whitish spots, probably glands, that are dried out.

Dryopteris crassifolia (Bl.) O. Kze, and related species.

D. crassifolia is, as interpreted in Syn. Fil., by Beddome and Ridley a composite species, including several distinct forms, which I consider good species. In the large collections of Bornean ferns examined by me I find six or seven species pertaining to this group, which presumably also occur in the Malay Peninsula. This narrow group represents the American subgenus *Steiropteris* in Malaya, but is probably not genetically related to it. All species are very uniform in several characters, by which they differ essentially from all other species of the genus. The fronds are more or less coriaceous, when dried of a characteristic brown colour, the lower pinnae distinctly stalked, the veins simple and the basal ones connivent to the sinus, not truly united; in most species an intermittent vein runs from the costa between two segments to the sinus. It is a true vein, not a carinate fold as found in *Steiropteris*. Indusia generally large, but easily rubbed off. Rhizome (of all species?) creeping, the lamina not narrowed below, often terminating in a subdistinct pinnatifid end-pinna, yet not imparipinnate. To this group must naturally be joined some few species that differ from *D. crassifolia* and its immediate allies by the densely scaly stipe and lower part of rachis. All these species at present known to me may be distinguished by the following key:

1. Stipe naked or scaly near base only; rachis without scales or practically so - - - 2
 Stipe and lower part of rachis densely scaly with linear castaneous scales, or woolly - - - 6
2. Leaf papyraceous or chartaceous. Pinnae about 2 cm. or less wide, deeply incised to a wing to the costa 1—2 mm. wide, the segments under 3 mm. in width; the

posterior basal vein springs out from the midrib or from the costa close to the axil of the midrib, reaching the edge just above the bottom of the sinus, to which the opposite anterior vein runs - 3

Leaf rigidly coriaceous. Pinnae 2—4 cm. wide, incised $1/2$ to $2/3$ of the way to the midrib, the segments 5—10 mm. broad; the posterior basal vein springs out from the costa 1—5 mm. from the base of the midrib, often midway between two midribs, and running straight to the sinus, below which it is connivent with the opposite anterior vein - - - 5

3. Leaves small, rarely 25 cm. long including the stipe, 4 cm. wide. often much smaller - - - *D. Teuscheri*
Leaves much larger, 50—100 cm. v. A. v. R.
long, 25 cm. wide - - - 4

4. Leaf brown when dried; lower pinnae short-stalked (stalks 1—2 mm.); rachis and costae beneath shortly pubescent and furnished with scattered linear brown scales; edges of segments distinctly thickened - - - *D. chlamydophora*
Leaf grey-green when dried; Ros.
lower pinnae on stalks 1—1.5 cm. long; leaf practically glabrous throughout, at best thickly puberulous on rachis above and on costae; scales few or none - *D. Beccariana*

5. Sori subcostular or at least distinctly inframedial; costae without scales beneath (?); pinnae incised $3/4$ of the way down, the costal wing at best 5 mm. broad; segments 5—7 mm. broad, falcate (Ces.) C. Chr.

D. crassifolia
(Bl.) O. Kze.

6. Pinnae scarcely 2 cm. broad; basal veins both running from the base of the midribs to the sinus; costae *D. Motleyana*
(Hook.) C. Chr.

- and veins beneath short-hairy;
indusia persistent - - - *D. echinata*
Pinnae 2—4 cm. broad; posterior (Mett.) O. Kze.
basal vein springing out from the
costa and meeting the opposite
anterior one below the sinus - 7
7. Costae above broadly sulcate with
the edges of the furrow densely
bearded with brownish patent
hairs; leaf coriaceous, brownish
when dried - - - 8
Costae above narrowly sulcate
antrorsely strigose with shorter
or longer hairs; leaf subcoriaceous
or rather thin, grey-green - *D. trichopoda*
C. Chr.
8. Costae and veins beneath sparsely
pubescent; indusia small or none
(?); rachis scaly in the lower *D. Hallieri*
part only - - - (Christ) C. Chr.
Costae and veins densely villous;
indusia persistent, hirsute; rachis
scaly throughout - - - *D. paleata* Copel.

Dryopteris Teuscheri v. A. v. R., Bull. Dept. Agric. Ind.
Néerl., 18, 6. 1908. Mal. Ferns, 183.

To this species, known to me from description only, I refer some specimens from Borneo and Sumatra which differ from the other species of the group by their small size. The largest leaf seen is 25 cm. long by 7 cm. wide, the stipe excluded, others much smaller, 10 cm. long by 2 cm. wide, chartaceous, brownish when dried, glossy above, finely downy and glandular beneath; rachis brownish, quadrangular, rather densely and long-hairy above, glabrous beneath; pinnae alternate, distinctly petiolate, (petioles 0.5—1 mm. long) the basal ones somewhat reduced and often reflexed, the medial ones the largest, 4 cm. long, 1 cm. wide, of small leaves 1—2 cm. long, 3—6 mm. wide, below the short entire obtuse or acute apex, cut down to a wing 1 mm. broad; upper pinnae sessile subentire. Segments oblique, oblong, obtuse, parallel, entire, 1—1.5 mm. broad, the basal ones of lower pinnae much reduced, the upper one free, 1 mm. long and broad, the lower one often quite obsolete. Veins free, simple, about 6-jugate, the anterior basal one running to the sinus, the posterior reaching the edge just above the bottom of the sinus. Sori medial, slightly impressed; indusia persistent, reniform, brown, glabrous (hairy, t. v. A. v. R.). Sarawak: Mt Matang (J. Hewitt 1908, Herb. Copeland); Bongo Range (C. J. Brooks 13, Herb. Copeland, Herb. C. Chr.). Sumatra: (J. Winkler 51).

In size and general habit this new species resembles small forms of *D. gracilescens*, but several important characters, as colour, texture, venation, indusia, show that its

nearest relative is *D. Beccariana*, and I referred my first specimens to that species, but the better specimens in herb. Copeland have, I believe, justified its segregation as a distinct species, especially differing from *D. Beccariana* by its much smaller size, short-tipped pinnae, and the rachis being rather longhairy above. I have seen no specimens of this species from the Malay Peninsula, where it very likely occurs. The specimens referred here are not quite identical; that from Sumatra is glandular and hairy beneath, as described by v. A. v. R.; those from Borneo without glands and glabrous beneath. The type was collected in Borneo.

Dryopteris Beccariana (Cesati) C. Chr., Index 254.

Nephrodium Beccarianum Cesati, Atti Acad. Napoli, 7, part 8, 23, 1876.

Beautiful specimens of this hitherto badly known species were collected by Dr. E. Mjöberg on Mt. Matang, Sarawak, which are fully identical with a fragment of the type, leg. Beccari (Kew!). In most characters it agrees with *D. Teuscheri*, but it is much larger. Stipe up to 50 cm. long, at base with many lanceolate castaneous scales, lamina 40-50 cm. long, 15-25 cm. broad, grey-green, papyraceous, practically glabrous and naked throughout (some minute hairs may be found on the upper part of the stramineous rachis and on the costae beneath). Most pinnae long-stalked (stalks 1-1.5 cm. long) terminating in long subentire caudate apex, incised to a wing 1.5-2 mm. broad, segments parallel, entire, oblique or subfalcate, subacute, about 3 mm. broad (those of the sterile leaf a little wider), the basal ones of lower pinnae much reduced or both fully obsolete, then the pinnae shortly cuneate at base. Veins about 12-jugate, simple, the basal ones running like those of *D. brunnescens*. Sori inframedial, indusia large, coriaceous, rufous or deep brown, glabrous, easily rubbed off.

SARAWAK: Mt. Matang (Beccari, Kew! E. Mjöberg, Herb. C. Chr.)

NEGRI SEMBILAN: Gunong Angsi, 1200 ft. (E. S. & G. Hose 4813, received from Kew). The latter specimen differs a little from the type by the sori being close to the midrib.

Dryopteris chlamydophora Rosenstock, Meded. Rijks Herb. Leiden, no. 31,5. 1917.

Lastrea nephrodioides Bedd., F. B. I., pl. 199 (not Moore).

Closely resembling *D. Beccariana* in size, texture, cutting and venation, but brown when dried. It differs by the rachis and costae and veins beneath being shortly pubescent and furnished with several linear brown scales, the underside being somewhat glandular, and by the much shorter 2-4 mm. long petioles of the lower pinnae; largest pinnae 20 cm. long, 2 cm. wide, the margins distinctly thickened,

the upper ones truncate-subcordate at base; veins 10-12 jugate; sori inframedial with large red indusia; sporangia mixed with shining red glands.

BORNEO: (Korthals, type in Leiden!); Sarawak, top of Mt. Poi (E. Mjoberg. Herb. C. Chr.).

MALAY PENINSULA: JOHORE, G. Pantl (Holttum 18089); without definite locality, Kew distr. 738 (Herb. Copenhagen).

Most specimens quoted have been named *D. crassifolia*; they differ essentially from that species by much thinner texture, venation and glands. *Lastrea nephrodioides* Bedd., from Burma, referred by the author himself to *L. crassifolia* (Handb. 238) is according to description and illustration a more hairy form of *D. chlamydophora*; the name *nephrodoides* is not available in the genus.

Dryopteris crassifolia (Bl.) O. Kze.; C. Chr., Ind. 258.

Lastrea lata J. Sm., Hook. Journ. Bot., 3, 412.

The true *D. crassifolia* is, according to a cotype specimen from Java, leg. Blume, a much more rigid plant than the three former species, and with different venation owing to the pinnae being less deeply lobed as noted in the key above; the edge of the falcate segments is distinctly thickened; veins about 10-jugate; costae shortly strigose above, rather densely whitish-pubescent beneath with short crisped hairs and furnished with some brown scales towards the base, surfaces otherwise glabrous. Sori near the midrib, indusia apparently smaller and less coriaceous than in the former species.

This species is probably distributed through the whole Malayan region, but its area cannot now be determined with certainty, because most specimens so named appear to belong to other species. *Lastrea lata* J. Sm. from Luzon (Cuming 266) agrees closely with Blume's type, and a specimen from Perak (G. Hijau, Burkill 12588) is as to most characters typical, differing somewhat by the 1-2 cm. long stalks of the pinnae; according to Mr. Holttum it falls under *Nephrodium brachyodon* Bedd., Handb. 281, which to me is nearly identical with *D. Motleyana*.

Dryopteris Motleyana (Hook.) C. Chr., Ind. 278.

Nephrodium Motleyanum Hook., Syn. Fil., 266 (sub *N. crassifolia*).

Nephrodium brachyodon Bedd., Ferns Brit. Ind., Suppl., pl. 379; Handb. 281; Ridley 74; not Hooker.

In colour, texture and pubescence very similar to *D. crassifolia*, from which it differs mainly by its less deeply cut pinnae and medial sori. Stipe about 50 cm. long, scaly at base, like the rachis greyish-brown and finely puberulous. Lamina ovate-lanceolate or ovate-deltoid, 40-50 cm. long, 15-20 cm. wide, the sterile ones somewhat larger, pinnate,

rather abruptly narrowed into a pinnatifid apex. Lateral pinnae in 10-15 pairs, short-stalked (petioles of the lower ones rarely 1 cm. long), 10-12 cm. long, 2-2.5 cm. broad, truncate at base, terminating in a 2-3 cm. long entire acuminate apex, incised $1/3$ - $1/2$ of the way to the midrib into falcate segments 5 mm. long and broad. Veins of fertile segments 8-9-jugate, the posterior basal one generally springing out from the costa just below the sinus, below which it meets the opposite anterior one; the following two veins run out to the edge close to the bottom of the sinus. Sori medial or a little supramedial, indusia small fugacious; receptacle with several globose glands. Costa whitish-puberulous beneath, and towards the base furnished with several linear, brown scales.

BORNEO: LABUAN (Motley, type, Kew!); SARAWAK, Mt. Merinjak (Native collector, Sarawak Museum 161); DUTCH BORNEO, G. Damoet (Hallier 557).

PERAK: Gunong Keledang (Ridley 9537).

D. Motleyana, as here understood, includes the Asiatic form, which English botanists wrongly have referred to the American *D. brachyodus* (Kze) O. Kze. This is quite another species with 3-4 pairs of veins joining a membrane below the sinus and with a distinct aerophore at the base of the pinnae; in my monograph of the genus *Dryopteris*, 1, p. 172, I have referred it to *D. glandulosa* (Desv.) C. Chr. (not the Asiatic *D. glandulosa*) as a variety. Beddome's figure of his *N. brachyodon* is as a whole good, but the venation is not shown quite correctly.

To *D. Motleyana* I provisionally refer the following form as a variety:

var. *dulitenses* n. var.

Pinnae in four subopposite pairs below a terminal one nearly conform with the lateral ones, the largest 15 cm. long, 4 cm. wide, the basal ones on stalks 1.5 cm. long, incised about $1/2$, the segments nearly 1 cm. broad, otherwise scarcely different from the type.

SARAWAK: Mt. Dulit (E. Mjoberg, Herb. C. Chr.).

The following species form a special group, well characterised by the strong stipe being densely covered with castaneous scales throughout, a character very rarely found within the genus *Dryopteris*. As to other characters, the species show a close affinity to the narrow group of *D. crassifolia*. Most species are known from a single collection, and it is probable that their number should be considerably reduced. They differ chiefly by the density of the pubescence, a character not always a good one, and it is not improbable that they will appear to be forms of a single species.

Dryopteris echinata (Mett.) O. Kze. C. Chr., Ind. 262.

Lamina firmly herbaceous, 70-80 cm. long, rather gradually attenuated into a pinnatifid apex. Pinnæ 15 cm. long, 1.5-2 cm. broad, the basal ones somewhat reduced and reflexed, incised to a wing about 2 mm. broad, the segments subfalcate, obtuse, parallel, 3 mm. broad; veins 9-10 jugate, the basal ones both running from the base of the midribs to the bottom of the sinus. Costae above deeply sulcate with the raised edges of the furrow rather densely antrorsely strigose, the upper side otherwise glabrous, the margins ciliate; costae and midribs beneath densely and shortly pubescent with whitish, patent hairs, the veins and leaf-tissue thinly downy or almost glabrous. Sori inframedial, indusia persistent, brown, white-setose.

BORNEO: (Korthals!), and several other specimens.

Dryopteris Hallieri (Christ) C. Chr., Ind. 269.

Intermediate between *D. echinata* and *D. trichopoda*, resembling the former in pubescence, the latter in texture. The sessile pinnæ are 15-20 cm. long, 3 cm. broad, incised to a wing 4 mm. broad, coriaceous, brown, their costae broadly sulcate above, densely bearded by patent brownish hairs; costae and veins beneath pubescent with whitish needle-like shorter and longer hairs. Veins raised below, 10-11 jugate, the posterior basal one springing out from the costa about 1 mm. from the midrib and meeting the opposite anterior one a little below the sinus. Sori inframedial; indusia all rubber off.

DUTCH BORNEO: Amai Ambit (Hallier 3204!).

Dryopteris paleata Copeland, Philip. Journ. Sci., 9 C, 228. 1914. This comes very near to *D. Hallieri*, but is much more hairy and the indusia are rather persistent and hirsute. Costae above bearded as in *D. Hallieri*, beneath like the veins densely but shortly and softly villous, the margins long-ciliate. Further it differs in the rachis being densely scaly throughout, the scales about 1-2 cm. long, castaneous, lanceolate-acuminate, slightly fimbriated; and in all pinnæ being short-stalked, at least distinctly so in the specimen from the Peninsula, which otherwise agrees closely with a cotype specimen in Herb. Bonaparte. Pinnæ 15-20 cm. long, 2-2.5 cm. wide. Sporangia with numerous globose glands intermixed.

SUMATRA: Lebang Tandai, Benkoelen (C. J. Brooks 68. Herb. Bonaparte).

NEGRI SEMBILAN: G. Angsi (Holtum 9926).

Dryopteris trichopoda C. Chr., Ind. 298.

Nephrodium polytrichum Baker, Jour. Bot., 1891, 107.

Leaf 1 meter or more long, subcoriaceous. Pinnæ up to 30 cm. long, 4.5 cm. broad, long-acuminate, sessile, incised to a wing 5 mm. broad, the segments falcate, 5 mm. broad the upper basal one somewhat reduced; costae and veins

densely hirsute beneath with long patent hairs. costae above shortly strigose, not bearded as in *D. Hallieri*. Veins 14-15 jugate, not raised below, the basal ones connivent below the sinus. Sori inframedial; indusia small, hirsute.

SARAWAK: Lingga Mts., (Bishop Hose, Kew!; Hewitt).

The rachis is not destitute of paleae as described by Baker; the scales become fewer upwards and extend to the lower part of the costae beneath as in the other species of the group.

To *D. trichopoda* I refer with some doubt a couple of specimens, that differ from the type in thinner texture, more soft pubescence and narrower pinnae; the under side is slightly glandular with red glands, the receptacle with many globose glands.

PENANG: C. G. Matthew 934 (Herb. C. Chr.).

SUMATRA: J. Winkler.

This form is evidently *N. crinipes* of Ridley (p. 71), not of Hooker.

The North-Indian *D. crinipes* is quite another species, with the basal veins truly united and with several pairs of reduced pinnae below.

Dryopteris persquamifera v. A. v. R.. (Bull. Jard. Bot. Buitenzorg, Ser. II, no. XVI, 10. 1914) from Celebes, known to me from description only, is evidently a species of this group.

The following species resembles in several characters those just mentioned, but its pubescence is peculiar and the venation is different, so that I dare not now associate it with them.

Dryopteris monodonta C. Chr., Ind. 278.

Lastrea unidentata Bedd., Handb. Suppl., 53; Ridley 64. (not *Dryopteris unidentata* (Hook. et Arn.) C. Chr.).

A specimen from the type locality, Gunong Bubu, Perak (Wray 3873) belongs no doubt to this species, although it does not agree in all details with Beddome's description. It is easily distinguished from the former species by stipe and rachis being densely and softly velutinous with thin jointed hairs, which are mixed with several lanceolate castaneous or blackish scales like those of *D. paleata*; in young leaves these scales are probably much more numerous. Pinnae strictly sessile, the basal segments somewhat produced and sublobate at base (rarely unidentate as described by Beddome, the name thus an unsuitable one) costae densely tomentose (not bearded) above, more thinly hirsute beneath with hairs like those of the rachis, and beneath dotted with conspicuous yellowish, dull glands. The basal veins spring both out from the midrib above its base and reach the margin above the bottom of the sinus as in the subgenus *Lastrea*. Sori

inframedial or subcostular, the indusia brown, thin, erose, glabrous, subpersistent.

Dryopteris heterocarpa (Bl.) O. Kze.

To this extremely variable species I refer as a glabrous form *Nephrodium glaucostipes* Bedd. (Ridley 75) judging from a cotype specimen in the Singapore Herbarium (Kunstler 2046). The under side is densely dotted with yellow glands as in the type, a character not mentioned in Beddome's description. Only one pair of veins truly join, and the following two run to the sinus. Similar forms occur in Borneo.

Dryopteris angustipes Copeland, Philipp. Journ. Sci., 7 C, 60. 1912.

NEGRI SEMBILAN: Setul Pass (E. S. & G. Hose 5050, received from Kew as *Nephrodium molle*).

A weakly characterised species, nearer *D. heterocarpa* than the *parasitica* complex, marked by a long row of reduced auriculiform pinnae along the stipe nearly to its base, the densely glandular under side, which is glabrous beyond the antrorsely strigose costae and contulae, the upper side strigose with appressed hairs and with scattered patent hairs on the veins; only one pair of veins anastomose. The specimen quoted agrees well with the type from Sarawak (Brooks 110, Herb. Copeland!). I am inclined to consider it a form of *D. heterocarpa*.

Dryopteris parasitica (L.) O. Kze. C. Chr., Ind., pro parte.

Nephrodium didymosorum Bedd., Ferns Brit. Ind., pl. 200.

Nephrodium tectum Bedd., Handb. Suppl., 79.

N. molle var. *didymosorum* Ridley 73.

Lastrea cana Bedd., Kew Bull., 1909, 424; Ridley 64. (not J. Sm.)

Among the numerous forms spread through all the tropics referred by authors to *D. parasitica* (*Nephrodium molle* auctt.) that described as *N. didymosorum* Bedd. best agrees with the genuine *Polypodium parasiticum* L., which is rather common in South-eastern China. It is densely hairy throughout, the lower pinnae not abbreviated and only one pair of anastomosing veins; sori often in a single pair at the base of each segment, but this character is not constant, 3-6 pairs of sori often being present. The specimen from Selangor (Ridley 7859) referred by Beddome and Ridley to *L. cana* belongs here; the genuine *D. cana* is a *Lastrea* with free veins.

Quite different from the true *D. parasitica* is a group of forms, which occur everywhere in tropical Asia and are commonly referred to *Nephrodium molle*, the type of which

is American, and to *N. amboinense*; I now refer them all to a single species, which I call

Dryopteris subpubescens (Bl.) C. Chr. comb. nov.

Aspidium subpubescens Bl., Enum., 149. 1828.

Nephrodium amboinense auctt.; Bedd., Handb. Suppl., 75.

N. molle var. *amboinense* Ridley 73.

This species differs materially from *D. parasitica* by the lower 2-3 pairs of pinnae being considerably abbreviated, by the less pubescent, often subglabrous surfaces, and by 3 or 4 lower veins (2 pairs) being united. The typical form is smaller than *D. parasitica*, the pinnae rarely 10 cm. long, 1.5 cm. broad. Hitherto this species has been named by most authors *N. amboinense* or *N. molle* var. *amboinense*, but it agrees badly with the type specimen of *Aspidium amboinense* Willd. (Bot. Mus. Berlin!) which is much smaller and less incised. Till now I have seen no specimen that exactly matches Willdenow's type from Amboyna, while on the other hand numerous specimens examined closely agree with the type of *A. subpubescens* Bl. from Java, leg. Blume! Typical *subpubescens* is a common fern in Malaya and several specimens from the Peninsula have been seen.

To this species I provisionally refer as a variety: var. *major* (Bedd.).

Nephrodium molle var. *major* Bedd., Handb. Suppl., 76.

Dryopteris sumatrana v. A. v. R., Mal. Ferns, 227.

Larger than the type; pinnae up to 15 cm. long, 2 cm. broad, bright green and of firmer texture, both surfaces finely downy with longer hairs on the costae and veins.

Common in Borneo, Sumatra and in the Peninsula (Singapore, Ridley 9481 and other specimens seen). It is perhaps a distinct species, but specimens from Borneo are intermediate between it and typical *D. subpubescens*.

To this variety I refer a specimen from Singapore (Rifle Range) quoted by Ridley under his *N. multilineatum* (p. 72). It differs from the common form by the lack of abbreviated pinnae, but as to all other characters it is typical. *N. multilineatum* Bedd. and Ridley should be called *Dryopteris megaphylla* (Mett.) C. Chr. It is widely different from all forms of the *parasitica* complex by its much larger fronds with pinnae up to 30 cm. long, nearly glabrous, shallowly cut only and with several pairs of alternately anastomosing veins. Several specimens distributed from Kew under the name *N. brachyodon* belong here.

A third, but somewhat doubtful species, is *Dryopteris procurrens* (Mett.) O. Kze.; C. Chr., Ind.

Nephrodium molle var. *procurrens* Ridley 73.

It differs mainly from *D. subpubescens* by its long creeping rhizome, but is otherwise so like it that specimens

without rhizome can scarcely be determined with certainty. Studies in the field may decide, perhaps, whether it is a good species, or, as Beddome believed, a form of *D. subpubescens*. The north Indian form referred by some authors to *D. procurrens* seems to be another thing. It is the var. *aureum* Clarke (Bedd. Handb. 278) and has been later redescribed as *Dryopteris cylindrothrix* Rosenstock, Fedde Reperit., 12, 246. 1913.

Dryopteris Toppingii Copeland, Philipp. Journ. Sci., 12 C, 56. 1917. A co-type specimen of *Nephrodium pennigerum* var. *malayense* Bedd. (Handb. Suppl. 74: *Dryopteris indica* var. *malayense* v. A. v. R., Mal. Ferns 224: *Nephrodium indicum* Ridley 73) agrees very closely with the type of *D. Toppingii* from Mt. Kinabalu, B.N.Borneo (Topping 1766, Herb. Copeland!), differing by both surfaces being slightly downy and the indusia being pubescent; notwithstanding this difference I prefer to call the specimen *D. Toppingii*. The sori are not medial on the veins as described by Ridley but submarginal just as in the type.

Dryopteris mirabilis Copeland, Philipp. Journ. Sci., 6 C, 137, pl. 19. 1911.

Phegopteris cordifolia v. A. v. R. Bull. Jard. Buitenzorg, II S, XI, 19, pl. 5. 1913.

Dryopteris cordifolia v. A. v. R., l. c., C. Chr., Ind. Suppl. prélim., 14.

Polypodium holophyllum Baker, Journ. Bot., 1888, 325 (not 1879, 43).

Dryopteris holophylla C. Chr., Ind., 271. 1905.

KEDAH: Pulau Langkawi (Holttum 17436).

As here interpreted this species includes a number of forms, which most authors have referred to *D. glandulosa* (Bl.) O. Kze. They differ from that species by the lateral pinnae being very few (1-2 pairs) or none, and much smaller than the large terminal one, and by the lack of glands; both surfaces densely verrucose. The frond is sometimes simple, cordate at base, and the edges subentire; this is *D. holophylla* from Sarawak (Hose, Kew!). *D. cordifolia* v. A. v. R. from Dutch Borneo (cotype in Rijks Herb. Leiden!) is the same with 2-3 lateral pinnae, and *D. mirabilis* Copeland from Sarawak (Brooks, Herb. Copeland!) is very nearly the same with a single pair of pinnae and with the indusiate sori arranged in distinct rows parallel to the midrib; the end pinna is more or less deeply crenate-dentate. The specimen from Kedah agrees best with *D. mirabilis* Copel., type, but 3-5 lateral pinnae are present. Like most forms of the species its leaves are subdimorphous, the fertile ones being narrower on longer stalks.

Dryopteris vilis (Kze) O. Kze.; C. Chr., Index, 300.

Aspidium intermedium Bl., Enum., 161; not others.

Dryopteris intermedia O. Kze.; v. A. v. R., Bull.

Jard. Buitenzorg, III S, 2, 144. 1920.

?*Lastrea intermedia* Ridley 68.

Dryopteris rhodolepis C. Chr., Ind. 288, pro parte.

Nephrodium sarawakense Bak., Journ. Linn. Soc. Bot., 22, 225. 1886.

Dryopteris sarawakensis v. A. v. R., Mal. Ferns, 200.

Lastrea padangensis Bedd., Handb. Suppl., 60. 1892. Ridley 68.

Dryopteris padangensis C. Chr., Ind. 282.

According to Prof. Rosenstock, who has examined the type specimens of both species in Leiden, *Aspidium vile* Kze is identical with *A. intermedium* Bl., and *N. sarawakense* Bak. (type, Kew!) is exactly the same. Unaware of this, in my Index I preferred for the whole complex of forms referred in Hook. Bak. Syn. Fil. to *N. intermedium* Clarke's name *rhodolepis*, used originally for a north Indian form, which I now consider distinct from *A. intermedium* Bl. Both this name and *Lastrea Blumei* Moore are invalidated within the genus, and the species must, therefore, now be called *D. vilis*. It seems to be very variable, and found in most regions of tropical Asia and Polynesia, in some places running gradually into related species, e.g. *D. aciculata* (Bak.) C. Chr. I hope to be enabled to unravel these forms later on; here it must suffice to state that all specimens seen from the Malay Peninsula belong with approximate certainty to *D. vilis*; very likely the large *D. aciculata* also occurs there, as it is common in Borneo. I have received from Mr. Holtum a specimen from Pahang, gorge of the Tras (Burkill 16939) named *D. padangensis* (Bedd.) C. Chr. It agrees excellently with Beddome's description, and I think it was rightly named; it appears to be fully identical with *D. vilis* (*N. sarawakensis* Bak.), and I dare, therefore, reduce Beddome's species to a synonym. Another specimen from Pahang, (Buloh Telang, P. Tioman, Henderson 18593) is unfortunately sterile; it is intermediate between *D. vilis* and *D. aciculata* and belongs perhaps to the latter species.

Dryopteris Boryana (Willd.) O. Kze.; C. Chr., Ind.

Phegopteris Kingi Bedd., Handb. Suppl., 84; Ridley 54.

Dryopteris Kingi C. Chr., Ind. 273.

Although Beddome (Handb. 266) quoted "Malay Peninsula" as a locality for his *Lastrea Boryana*, the species is not mentioned by Ridley. Having seen a couple of pinnae of the type collection of *Phegopteris Kingi* Bedd. from Perak (Kunstler 2250) I have little doubt that the "species" is a form of *D. Boryana*. It differs a little from the form occurring in Java by the pale green colour and apparently

exindusiate sori; in size, texture cutting and pubescence it is identical. *Polypodium subtripinnatum* Clarke, referred here by Beddome, is another exindusiate form. Whether the Indian-Malayan *D. Boryana* is the same as the genuine *D. Boryana* (Willd.) from Réunion is another question; if not, the old name *Aspidium divisum* Wall. (*Nephrodium* Hook.) must be taken up for the Asiatic forms.

Polystichum lindsaeifolium Scort., Ridley 61 (wrongly spelled *lindseaeifolium*).

The specimen from Kelantan (Nur 12118) referred here by Ridley is so different from the North-Indian *P. obliquum* (Don) Moore that I consider Ridley's new species a good one. The leaves are much longer, up to 30 cm. long by 3.5 cm. wide, with 30-35 pairs of pinnae; these are subdimidiate, auricled at the upper base and shallowly crenately toothed at the upper and outer edge, the short teeth obtuse, never aristate, the stipe 4-5 cm. long with only some light brown scales, the rachis very scantily fibrillose or almost naked as are the surfaces; at best some few minute scales may be found beneath. Sori submarginal at the base of the teeth; indusia pale, orbicular, easily rubbed off.

Aspidium subdecurrans (Lueress.) C. Chr., Ind. 94.

Phegopteris subdecurrans Lueress., Bot. Centralbl., 11, 30. 1882.

SINGAPORE: Pulau Ubin (F. Kehding 2960!, Ridley 6027).

This characteristic species was omitted by Ridley although collected by himself at the type-locality. It is allied to *A. polymorphum* Wall., distinguished from that species by the terminal pinna being decurrent. The quite glabrous fronds are somewhat dimorphous, the sterile ones being larger than the fertile; terminal pinna of sterile frond up to 35 cm. long and 15 cm. wide, ovate, acuminate, entire or repand, at base confluent with one or two pairs of ascending large lobes, the lowest of which are decurrent along the rachis, the wing thus formed not reaching the upper pair of free pinnae, which are adnate to the rachis;¹ below them another pair of free, short-stalked entire pinnae, these broadest at the middle (6 cm.) and narrowed to both ends; fertile fronds similar but smaller; main veins distinct to the edge, connected by numerous arching cross-veins, smaller veins forming numerous angular areoles, mostly without free included veinlets. Sori exindusiate, small, irregularly scattered, dorsal on the netted veins, often elongated and confluent.

Aspidium terminale Rosenstock, Meded. 's Rijks Herb. Leiden, 31, 4. 1917.

¹ The extent of the wing on the rachis is very variable in this species. It is sometimes continuous throughout the rachis, extending even below the lowest pinnae. (R.E.H.)

LOWER SIAM: Khaw Pok Hill (Haniff & Nur 3828).

This most distinct species was founded by Prof. Rosenthal on a specimen from Dutch Borneo (Gunong Kempai, Hallier 1821, Rijks Herb. Leiden!) and very briefly described. In all essential characters the specimen from Siam kindly sent me by Mr. Holtum fully agrees, but receding from it in some minor points. The type may shortly be described thus:

In habit not essentially different from *A. polymorphum* Wall. The leaf is pinnate with three pairs of opposite short-stalked pinnae, which are all entire, cordate at base, oblong, acute or short-acuminate, the lowest 25 cm. long by 7 cm. wide and with a triangular hastate terminal pinna, cordate at base and with a pair of spreading basal lobes, the central lobe triangular, slightly lobed. Texture thin, the larger ribs very shortly rusty-tomentose above, the surfaces otherwise glabrous. A scaly bud is borne on the upper side of the rachis at the base of the terminal pinna, and smaller buds are found on the costa, mostly at the axil of a main vein, sometimes also on the basal cross-veins. All veins distinct, the finer ones forming a dense net of small areoles between the cross-veins, the areoles with free included veinlets. Sori irregularly scattered over the whole underside, very small, nearly always apical on the free veinlets. Indusia subsistent, reniform, glabrous. The specimen from Siam agrees with the type in colour, texture, venation and sori; there is no bud on the rachis, but small buds are found here and there in the axils of the main veins. It differs chiefly in the shape of the pinnae, which are ovate or elliptical, rounded-cuneate at base, the basal ones unequally short-lobed, 18 cm. long by 10 cm. wide at the middle.

A. terminale differs chiefly from *A. polymorphum* by the gemmiferous rachis and costa and by the apical sori.

***Leptochilus malaccensis* sp. nov.**

Rhizome creeping, clothed with dark brown lanceolate entire scales. Leaves subapproximate, dimorphic. Stipe of sterile ones about 20 cm. long, slightly scaly. Lamina about 25 cm. long and wide, with 5-7 pairs of distant lateral pinnae and a conform terminal one, dark green, subcoriaceous, glabrous but obscurely paleaceous on the costa beneath and on rachis, the scales small, blackish-brown. Pinnae lanceolate, up to 15 cm. long, 1-1.2 cm. wide at the middle, the lower ones short-stalked, the upper adnate to rachis and a little decurrent, all long-cuneate at base and long-acuminate at apex, entire. Main veins tolerably visible to near the edges, other veins quite hidden. The veins anastomose about as in *L. heteroclitus* (Bl.), i.e. forming a costal areole and above this two large costular ones on each side of the main vein; between these are found three central ones, a middle larger

one and an upper and lower smaller one, all areoles without free included veinlets. Fertile frond similar with contracted pinnae, which are about 10 cm. long, 7-8 mm. wide.

PAHANG: Buloh Telang, Pulau Tioman, (M. R. Henderson, Herb. Singapore, 18589, type in Herb. C. Chr.). KEDAH: P. Langkawi. G. Raya, (Curtis 3371, L. Preslianus Ridley 115).

This apparently most distinct species was wrongly referred to *L. Preslianus* C. Chr. by Ridley, l. c. Certainly it resembles that species superficially, but the venation is totally different, resembling that of *L. heteroclitus* (Bl.) C. Chr. (cf. Blume, Fl. Javae, pl. 13) but owing to the narrowness of the pinnae, the number of intercostular areoles is, of course, much smaller.

Stenochlaena leptocarpa (Fée) Underwood, Bull. Torrey Bot. Club, 33, 47. 1906.

Lomariopsis leptocarpa Fée, Acrost., 69, pl. 29. 1845.

Stenochlaena sorbifolia, pro parte, Ridley 111.

PERAK: Birch's Hill, (I. H. Burkill, Herb. Singapore 12725).

The specimen agrees closely with Fée's figure of the type from Luzon (Cuming 132). Among the Malayan species of the genus this resembles most the West Indian *S. sorbifolia*, but is yet quite different. The numerous sterile pinnae are about 12 cm. long and scarcely 1.5 cm. wide, gradually long-acuminate, their base subequally rounded-cuneate. The species is probably widely dispersed through the Malayan region.

Stenochlaena cochinchinensis (Fée) Underwood, Bull. Torrey Bot. Club, 33, 46. 1906.

Lomariopsis cochinchinensis Fée, Acrost., 66, pl. 26. 1845.

Stenochlaena abrupta v. A. v. R., Bull. Jard. Buitenzorg, II S, XX, 24. 1915. Handb. Suppl., 429.

Stenochlaena sorbifolia, pro parte, Ridley 111.

SINGAPORE: Botanic Garden, in the Dell (Herb. Singapore, 17484).

PAHANG: Sedagong, Pulau Tioman (Henderson 18618).

One of the best characterized species of the *S. sorbifolia* complex. Sterile leaves sometimes simple, but developed ones pinnate with up to 12 pairs of pinnae, these 12-15 cm. long by 4-5 cm wide, the base cuneate below, rounded above, the apex suddenly narrowed into a short "traufelspitze." *S. abrupta* v. A. v. R. is the same (an authentic specimen in herb. Leiden). The species is known from Cochinchina, Borneo, the Malay Peninsula, and Sumatra.

LINDSAYA

The smaller, simply pinnate forms of this genus were referred by older authors to several distinct species, the number of which later was greatly reduced, and Baker and Beddome referred most of them to a single species, *L. cultrata*. It seems to me however that some of the older species may be maintained as valid ones, and I shall here try to characterize briefly those species recorded from the Malay Peninsula.

A. Rhizome short-creeping, often very short, the leaves tufted, or nearly so.

1. *L. cultrata* (Willd.) Sw. . .

Stipe and rachis round beneath, sulcate above; pinnae about 1. cm. long, subacute, the lower edge convex, the upper nearly straight, with 2-3 low incisures; sori rather long.

This species was first described and figured by Willdenow as *Adiantum cultratum* (Phytogr., 14, pl. 10, fig. 2) after specimens from the Malabar coast, probably from the vicinity of Tranquebar. All south Indian specimens seem to agree very well with his type, and specimens from Himalaya, southern China and Siam are not essentially different. The species is said to be distributed through the whole of tropical Asia, but I have seen no specimens from the Malayan region that agree with the type, although it is possible that the species is to be found there. Most specimens from the Peninsula received as *L. cultrata* belong to the following species. Ridley (p. 22) quotes a large number of localities for *L. cultrata*; I suppose that the majority of them, perhaps all, really belong to

2. *L. Lobbiana* Hook., Spec., 1, 205, pl. 62 C.

L. crenulata Fée, Gen., 105, pl. 28, fig. 2.

Stipe and rachis quadrangular, sulcate above, the furrow with sharp raised edges. Leaf often much longer than that of *L. cultrata*, pinnae about 1 cm. long, the lower side straight or concave, the apex truncate, the upper side with 2-4 rather deep incisures; sori mostly shorter than in *L. cultrata* and extending to the outer edge. This species is apparently common through the Malayan region. Its synonymy is confused, and it is possible that the name chosen cannot stand; the older name *L. lucida* Bl., Enum. 216 (1828) applies perhaps to the same species. Judging from the figures quoted it seems probable that *L. crenulata* Fée, described from a specimen leg. Griffith presumably in Malacca, is identical with *L. Lobbiana*. Both were referred by Kuhn (Ann. Mus. Lugd. Bat. 4, 276) to *L. gracilis* Bl. as a var. *major*, but wrongly, I think, at least if *L. gracilis* Bl. is rightly understood by modern writers as being a species with a wide-creeping rhizome.

L. Lobbiana is apparently common in the Malay Peninsula; the following specimens were all named *L. cultrata*.

PAHANG: Buloh Telang, P. Tioman (Henderson 18587). TRENGGANU: Kuala Berang (Holtum 15332). JOHORE: (A. Vesterdal 26 and 168).

3. *L. concinna* J. Sm.; Hook., Spec., 1, 205, pl. 61 B.

Stipe and rachis quadrangular; pinnae 5-8 mm. long, the lower side mostly straight or convex, the apex bluntly rounded or subacute, the upper edge entire, the sori, therefore, continuous from base to tip, rarely interrupted by a single incisure. Sterile pinnae obtusely toothed or crenate.

This species has been confounded with *L. gracilis*, from which it differs by its short rhizome and tufted leaves. It is known from the Philippine Islands, New Guinea, Borneo and occurs no doubt in the Malay Peninsula. Ridley refers two specimens to it (p. 21); his description is adequate.

4. *L. orbiculata* (Lam.) Mett. (*L. flabellulata* Ridley 23).

I mention this polymorphic species here, because the simply-pinnate forms of it often are confounded with the species mentioned above. These smaller forms differ manifestly from the other species by the shape of the pinnae, which are either semicircular or triangular with the sori along the outer edge, the sterile ones acutely dentate, the indusia distinctly toothed. A small specimen from PAHANG: Sungei Perting (Burkill 16574), received under the name *L. cultrata*, belongs here.

B. Rhizome wide-creeping with distant leaves.

5. *L. gracilis* Bl.; v. A. v. R., Handb. 261.

With this species as interpreted by van Rosenburgh I am not acquainted; the specimens so named seen by me I refer to *L. adiantoides* (Bl.) Kuhn. Mettenius and Kuhn united it with *L. concinna* and I am not sure that these authors were wrong, because Mettenius had examined Blume's type. Ridley (p. 22), who takes the species in the sense of v. A. v. R., refers to it a specimen from Negri Sembilan. The long creeping rhizome seems to be the only reliable character.

6. *L. plumula* Ridley, p. 22.

This species is distinct enough from the four species mentioned under group A by its long creeping branched rhizome, and certainly it is not *L. gracilis* v. A. v. R. It agrees with *L. cultrata* by its semiterete stipes and rachis and in shape of pinnae. These are 5-7 mm. long, ascending, the lower edge convex, the upper slightly incised, coriaceous in texture, pale green, the lower and inner edge narrowly involute resembling a strong rib and believed by Ridley to be a rib; the real vein along the lower edge is however not

thicker than in other species. The indusia are broader than in the other species, their uneven edge reaching quite to the margin. The species is no doubt closely related to *L. cultrata*.

***Nephrolepis acutifolia* (Desv.) Christ.**

Negri Sembilan: Seremban (E. S. & G. Hose 5016, received from Kew). This interesting species is in habit and pubescence a *Nephrolepis*, in sori a *Lindsaya*. To me it is the type-species of a most distinct genus *Isoloma* J. Sm., which name very unnaturally has been applied to a group of species which may scarcely be separated generically from *Lindsaya*.

***Humata angustata* (Wall.) J. Sm. var. *hastata*, n. var.**

Fertile leaves 3-8 cm. long, 1 cm. wide, lamina suddenly narrowed and decurrent nearly to the base of the stipe, this 1-1.5 cm. long and with the decurrent wings 1-1.5 mm. broad above; margins broadly lobed about half-way, the lobes irregularly crenate, the basal ones often the largest, 5-8 mm. long, horizontal, the lamina becoming hastate.

PAHANG: G. Kajang, Pulau Tioman (Henderson 18256).

Not knowing similar forms occurring in Borneo, one would be inclined to consider this remarkable plant specifically distinct from *H. angustata*, with which it agrees in scales, texture, colour and sori. It differs chiefly from specimens from Borneo by its small size, short stipe and hastate shape of most leaves. *H. attenuata* and *H. mutata* v. A. v. R., Bull. Jard. Bot. Buitenzorg, III S, 5, 205-206 (1922), are evidently closely related forms and also local derivatives of *H. angustata*.

***Humata kinabaluensis* Copeland, Philipp. Journ. Sci., 12 C, 48. 1917.**

To this species I refer with a little doubt a specimen from Pahang (G. Berumban, Cameron's Highlands, Henderson 17989) named by Mr. Holttum *H. alpina* (Bl.) Moore. It is certainly not that species but agrees very well with Copeland's species from Mt. Kinabalu (Topping 1745, Herb. Copeland!). I have seen two fertile leaves only; they are thickly coriaceous, tripinnatifid at base, the pinnae almost reduced to the thick ribs, each secondary segment bearing 3-4 sori with large indusia. This form resembles much more the genuine *H. botrychioides* Brack. from Polynesia than other Malayan forms wrongly referred to that species.

***Microlepis Ridleyi* Copeland, Philipp. Journ. Sci., 11 C, 39. 1916.**

This species is not mentioned by Ridley, although founded upon a specimen from Pahang collected by himself (no. 14200). I have received from Mr. Holttum a specimen

from the same state (Bentong, Burkill 16699) which corresponds closely to Copeland's description. The surfaces are not glabrous as described by him, but, especially the under side, microscopically puberulous, the hairs not dense. In this it approaches a specimen from Perak (Kunstler 8331) referred by Ridley (p. 32) to *M. Kurzii* (Clarke) Bedd. It does not belong to that species, of which I have what I consider a typical specimen from Burma, and which is, in a few words, a densely hairy *M. platyphylla*. Kunstler's specimen has the pinnules pinnatifid almost to the costules and the whole underside is very densely puberulous with short erect hairs mixed with some longer ones on the ribs. Mr. Holttum is of opinion that it is a form of *M. Ridleyi*, and perhaps he is right, but certainly it is the same as *M. Brooksii* Copeland from Sumatra, and probably also identical with *M. puberula* v. A. v. R. All seem to be forms of a single species.

***Microlepia speluncae* (L.) Moore., var. villosissima n. var.**

The whole frond, especially beneath, very densely villous with grey shorter and longer hairs mixed together, the longer hairs prevailing on the upper side. Probably a distinct species.

PAHANG: Pulau Tioman (Henderson 18873, Herb. C. Chr.).

***Saccoloma minus* (Hook) C. Chr. comb. nov.**

Microlepia alata J. Sm., Hook. Journ. Bot., 3, 416. 1841. (nomen).

Davallia inaequalis var. *minor* Hook., Spec. Fil., 1, 180, pl. 58 A. 1846.

Saccoloma moluccanum Mett.; C. Chr., Ind.

Dennstaedtia Kingii Bedd., Handb. Suppl., 6. Ridley 10.

PERAK: Larut (Kunstler 2118, cotype of *D. Kingii* Bedd.); Maxwell's Hill (Haniff 9083).

By his researches in Blume's herbarium in Leiden, Prof. Rosenstock has proved that Mettenius was mistaken in identifying *Microlepia alata* J. Sm., based on Cuming no. 119, and first described and figured by Hooker, with *Davallia moluccana* Bl.; the great bulk of specimens by Blume so named are identical with *Davallia amboynensis* Hook. = *Tapeinidium amboynensis* (Hook.) C. Chr. Ind. 631, which species subsequently must be named *Tapeinidium moluccanum* (Bl.) C. Chr. comb. nov. A single specimen in Blume's herbarium, and the only one seen by Mettenius, was with doubt referred by Blume himself to *D. moluccana*; it is thus the type of *Saccoloma moluccanum* Mett. I have a fragment of it, kindly sent by Prof. Rosenstock, and it agrees so closely with the two specimens from Perak that it may scarcely be

doubted that *Dennstaedtia Kingii* Bedd. is the same thing. Apparently it differs in indusial characters from *Saccoloma*, the indusium being cup-shaped, scarcely at all two-lipped, often protruding beyond the margin, and reflexed as in several species of *Dennstaedtia*, but the inner valve is distinctly attenuate towards the base, as in *Saccoloma*, and the whole habit with the characteristic unequal sided pinnæ and pinnulae, is entirely that of that genus.

In Blume's specimen the indusia are slightly two-lipped, but materially not different. From this Malayan type several of the Polynesian forms commonly referred to the same species are considerably different.

***Asplenium scolopendroides* J. Sm.**

PAHANG: Pulau Tioman, (Henderson 18763).

Easily distinguished from other simple-fronded species by the characteristic vein-like rim running parallel to the sori between two real veins. The specimen from P. Tioman agrees closely with the type at Kew (Cuming 318), well illustrated by Hooker (Ic. Plant., pl. 930), though the venation is not accurately shown.

***Asplenium dimidiatum* Sw.**

To this species Ridley (p. 46) refers a couple of specimens, of which I have seen that from Singapore. It is not at all *A. dimidiatum*, which is certainly not found in Asia, but it is difficult to say what the scanty specimen may be. It may be, as suggested by Beddome, a form of *A. adiantoides* (L.) C. Chr. (= *A. falcatum* Lam.), or perhaps of *A. nigrescens* Bl.

***Asplenium normale* Don.**

Some of the specimens referred by Ridley to *A. lunulatum*, at least Kunstler 8043, belong here. The genuine *A. lunulatum* Sw. certainly does not occur in the Malayan region; whether any of the many species related to it occurs in the Peninsula I do not know.

***Asplenium perakense* Matthew et Christ; Ridley 47.**

The specimen from Pahang quoted by Ridley (Holttum 11385) agrees excellently with Christ's description and is no doubt rightly named. It falls under *A. praemorsum* Sw. taken in a wide sense, but seems to be a distinct form worthy of specific rank. In gross characters it scarcely differs from other forms of *A. praemorsum*, but its scales seem to mark it sufficiently. They are of a pure brown, peltate, triangular-long-acuminate but not hair-pointed, slightly toothed at base, entire upwards, very finely reticulated but not clathrate; they differ widely from those of the Indian form of *A. praemorsum*, which are blackish, clathrate, shortly ciliate and hair-pointed.

***Asplenium spathulinum* J. Sm., Hook. Journ. Bot., 3, 408. 1841.**

A. cuneatum Ridley 48.

A. affine auctt., quoad plant. asiat.

PERAK: Bujong Malacca (Ridley 9546). PAHANG: Sedagong, P. Tioman (Henderson 18898).

The two specimens quoted match perfectly the type (Cuming 210, Kew!) and their resemblance to the true *A. cuneatum* Sw. of the West Indies is superficial only. The species is much closer allied to *A. affine* Sw. from the Mascarene Islands, but I think it is specifically different, being marked by the obtuse, erosodentate outer edge of the cuneate pinnules and by not being proliferous.

A. cuneatum var. *affine* Ridley (p. 48) from Perak (Kunstler 2228) is to me a tripinnate form of *A. spathulinum*. All these *Asplenium* differ very much in the degree of cutting.

Diplazium xiphophyllum (Bak.) C. Chr.

This species, founded upon a poor specimen from Borneo (Burbidge, Kew!) is apparently not rare in the Peninsula, but probably often confounded with *D. bantamense*, from which it differs chiefly by its narrower and much longer pinnae, often 40-45 cm. long, 3-3.5 cm. wide, terminating in a very long subulate apex.

Perak: G. Hijau (Burkill 12663). Pahang: Ulu Chineras (Burkill 15692). The former specimen differs from the type by the pinnae being irregularly double-crenate throughout; the latter by the lower pinnae being subcuneate at base; it matches nearly exactly *D. palauanense* Copeland, which I refer to *D. xiphophyllum*.

Diplazium sorzogonense Pr. and related forms.

This group of bipinnatifid species is extremely difficult, and the various forms are hopelessly mixed together in all herbaria. The material at hand from the Malay Peninsula may naturally be sorted into two species, *D. sorzogonense* and *D. speciosum* of Ridley (p. 51-52). They may briefly be characterized as follows:

Diplazium malaccense Presl, Epim. 86. 1849. Fée, Gen. 213, pl. 17 D, fig. 1.

D. Schkurii J. Sm., Hook. Journ. Bot., 3, 407 (nomen).

Asplenium Schkurii Mett., Aspl. no. 208.

Diplazium acuminatum Bl., Enum., 193. 1828? v. A. v. R., Mal. Ferns, 409 (p. p.). (not Raddi).

D. Christii C. Chr., Ind. 229. 1905 (p. p.)

D. speciosum Ridley, 52 (entirely or partly).

Rachis and costae beneath naked or very slightly scaly; pinnae 2 cm. wide, cut $1/2$ — $2/3$ of the way to the costa, oblique, oblong, 5 mm. broad, truncate, entire or slightly dentate at the apex; veins simple, 6-7-jugate; the anterior basal sorus diplazioid.

PAHANG: Fraser Hill (Nur 10508). NEGRI SEMBILAN: Bukit Putus (E. S. & G. Hose 174, received from Kew).

***Diplazium sorzogonense* Presl.**

Stipe, rachis and costae beneath more or less densely fibrillose with narrow brown or castaneous scales; pinnae 2-5 cm. broad, cut down to a wing 3-4 mm. broad into sub-horizontal oblong obtuse segments 4-5 mm. broad and finely serrate throughout or at the outer part only; veins simple, 10-11-jugate; diplazioid sori rarely found.

MALAY PENINSULA: (W. Norris 637, Herb. Copenhagen). PAHANG: G. Tahan (Nur. 7953); G. Rokam, P. Tioman (Henderson 18612).

D. speciosum Bl. is referred by most authors to *D. sorzogonense*, but considered distinct by v. A. v. R.; if rightly I dare not now express an opinion.

***Diplazium crenato-serratum* Bl.**

D. larutense Bedd. (Ridley 50) is probably a form of this species. I have not seen the type, but a specimen from Negri Sembilan (Holtum 9775) is said by Mr. Holtum to resemble the type of *D. larutense*, and it is to me very typical *D. crenato-serratum*. In a collection from Sumatra are found among typical leaves some that correspond closely to Beddome's description, especially by the broadly rounded tips of the pinnae.

***Polypodium subevenosum* Baker.**

P. Maxwellii Baker, Kew Bull., 1893, 211.

? *P. kinabaluense* Copeland, Philipp. Journ. Sci., 12 c, 60. 1917.

Mr. Holtum has sent me specimens from Penang, which he has compared with the type specimen at Kew and declares to be typical. As in the type some veins are produced and forked. The same specimens further fully agree with the type of *P. Maxwellii* Bak. from Borneo (Hose 296, Kew!) and with several other Bornean specimens recently examined; and *P. kinabaluense* Copel from Mt. Kinabalu (Mrs. Clemens 10649, Herb. Copeland!) seems to me the same. The differential character of short, simple, or produced forked veins is not a stable one. More different from the type is a specimen from Pahang (G. Kajang, P. Tioman, Henderson 18944; herb. Singapore). It is larger; leaves 10-12 cm. long by 0.5 cm. wide, all veins forked and the sori distinctly oblong, almost linear and somewhat immersed. This form evidently approaches the genuine *P. sessilifolium* Hook.—*P. malaicum* v. A. v. R. (Handb. 577) a Philippine plant that may be different from *P. subevenosum* (t. Holtum). *P. subevenosum* var. *sessilifolium* Ridley (p. 81) is certainly *P. subevenosum*.

***Polypodium minutum* Bl., Enum. 130; Fl. Javae 188, pl. 87 D.**

P. callophyllum C. H. Wright, Kew Bull., 1909, 362. Ridley 83.

PERAK: Gunong Hijau (C. G. Matthew, herb. Kew!).

I do not hesitate to refer this specimen to *P. minutum* Bl.; it agrees very perfectly with Blume's figure. In habit it resembles not a little *P. consociatum* from the same locality, differing from it by the oblong fertile segments, which are repand-crenate at the upper edge, and by the presence of two sori in several segments, one near its base, another in the outer half; sporangia mixed with many long hairs. Leaf grass-green, thin.

Polypodium consociatum v. A. v. R., Bull. Jard. Buitenzorg, II S, VII, p. 41, pl. 4, fig. 1. 1912. Handb. Suppl., 352.

Plectopteris gracilis Fée, Gen. 230, pl. 19B.

Calymmodon hirtus Brack., U. S. Expl. Exp., 16, 2.

Polypodium cucullatum Ridley 82 (pro parte?). (an Bedd. Handb. 307).

PERAK: Gunong Hijau, 3000 ft. (C. G. Matthew 925).

I have seen the only specimen quoted, but likely most or all of those quoted by Ridley under *P. cucullatum* belong to the same species that is abundantly different from *P. cucullatum*. The said specimen is perfectly identical with a beautiful lot of specimens from Mt. Dulit, Borneo (Mjöberg), which Prof. Copeland has named for me, giving the synonyms cited above. His identification may be right, but figures of Fée and v. A. v. R. do not show the characteristic shape of the upper fertile segments of my specimens; they are normally flat, rarely folded, and almost circular with a central sorus.

Polypodium Leysii Baker, Journ. Bot. 1879, 66.

Prosaptia semicrypta Copeland, Philipp. Journ. Sci., 9 C, 231. 1914.

Polypodium semicryptum C. Chr., Ind., Suppl. prél. 1912-16, 28.

PAHANG: Teku, G. Tahan (Haniff & Nur 8066); G. Rokam, P. Tioman (Henderson 18777).

The specimens were received from Mr. Holttum under the names *P. obliquatum* (8066) and *P. contiguum* var. (18777); they are nevertheless identical and agree perfectly with the type specimens of *P. Leysii* Baker from Sulu Archipelago, leg. Burbidge (Kew!) and of *Prosaptia semicrypta* Copel. from Benkoelen, Sumatra, leg. C. J. Brooks. (no. 93, Herb. Copeland!). The species is intermediate between *P. obliquatum* Bl. and *P. contiguum* (Forst.) differing from the former by the narrower, repand-crenate segments with submarginal sori; these sunk in deep cavities with raised, naked edges ("craters"), the craters oblique with the mouths nearly round. The genuine *P. obliquatum*

has broader, entire segments with the sori not close to the edge, the craters oblong; the genuine Polynesian *P. contiguum* (Forst.) (Davallia Ind. Fil.) has marginal sori with the craters protruding beyond the edge. Both species occur in the Malay Peninsula, but it seems probable that some specimens at least referred to them belong either to *P. Leysii* or to *P. Burbidgei* Bak., with which species *P. decipiens* Kuhn - *P. cryptosorum* C. Chr. (Ridley 84) must be united.

All these species are members of a narrow group of closely related species, some of which form the genus *Prosaptia*, very improperly referred by several authors, and in my Index, to *Davallia* as a subgenus, others belonging to *Eupolypodium*, forming a specialized group, *Cryptosorus*. All modern pteridologists agree, I think, in uniting *Cryptosorus* with *Prosaptia*, and either restore *Prosaptia* as a genus, or make it a subgenus of *Polypodium*. The alliance with *Davallia* is the furthest possible. To *Prosaptia* also belongs *P. barathrophyllum* Bak., found in Perak by Bishop Hose (Kew!); it is doubtfully different from *P. khasyanum* Hook.

***Polypodium mollicomum* Nees et Bl.**

P. fuscatum Ridley, l. c. 84 (and also Blume?).

P. malaccanum Bak., Ann. Bot. 5, 129. Ridley. l. c. 84 (excl. var.)

A co-type specimen of *P. malaccanum* Bak. from Gunong Mering (Ridley 3345, Herb. Singapore) is to me typical *P. mollicomum*. It differs from the following species by the more or less coriaceous leaves with indistinct veins, and with both surfaces throughout setose with rather short dark brown hairs.

***Polypodium brevivenosum* v. A. v. R., Bull. Jard. Bot. Buitenzorg, II S, XXVIII, 40. 1918. (ex descr.)**

P. malaccanum var. *pahungense* Ridley, l. c. 84.

PAHANG: (Herb. Singapore 8147, 15974, 17744).

Mr. Holttum has identified these specimens with *P. brevivenosum* from Sumatra, and I believe rightly. The species very much resembles in size and cutting *P. mollicomum*, but the leaves are thinner, the short lateral simple veins clearly visible, of a lighter colour, and the pubescence different; margins ciliated with long reddish hairs and few similar ones are scattered over the surfaces. Also the scales of the rhizome are much more numerous and conspicuous, light-castaneous, lanceolate, entire. I have the same species from Sarawak.

***Polypodium sarawakense* Baker, Journ. Linn. Soc., 22, 228. 1886.**

Pleopeltis superficialis var. *latifrons* Bedd., Journ. Bot., 31, 226.

Pl. peltata Scott.; v. A. v. R., Handb. Suppl. 376
Ridley l. c. 91.

Polypodium peltatum v. A. v. R., Handb. 632.

PERAK: Larut (Kunstler 2180).

Perfectly identical with specimens from Borneo. The rhizome of *P. sarawakense* Bak. (type in Kew!) is not naked as described by Baker, but clothed with easily deciduous almost orbicular blackish scales with brown edges, just as described by v. A. v. R. under his *P. peltatum*.

Polypodium regulare Mett., C. Chr., Ind. 558.

Gymnogramme campyloneuroides Bak., Journ. Linn. Soc. Bot., 24, 261. 1887.

Selliguea campyloneuroides Bedd., Handb. Suppl., 101.

Polypodium Hosei C. Chr., Ind. 534.

PAHANG: Sedagong, Pulau Tioman (Henderson 18895).

A comparison of the type-specimen of *P. regulare* Mett. (Borneo, Korthals, Herb. Leiden) and *G. campyloneuroides* Bak. (Sarawak, Hose 208, Kew) shows that they are absolutely identical. In his Handb. Suppl., p. 404, v. A. v. R. has reduced both *P. regulare* and *P. selliguae* Mett. (= *Selliguea membranacea*) to forms of *P. macrophyllum* Bl., and he may be right. In Ridley's paper this species is placed by error under *Syngamma* (p. 105).

Polypodium heterocarpum Bl., Fl. Javae, Fil., 167, pl. 75.

P. Zollingerianum Kunze; C. Chr., Ind. 575.

Pleopeltis Zollingeriana Moore. Ridley 93.

Nephrodium pteropodium Baker, Journ. Bot., 1888, 325.

Aspidium pteropodium Diels; C. Chr., Ind. 662

Polypodium Scortechinii Bak., Ann. Bot., 5, 477.

Pleopeltis Scortechinii Beddome, Handb. Suppl., 95.
Ridley 93.

I have examined both the type specimen of *N. pteropodium* Bak. from Sarawak (Kew!) and a co-type specimen of *P. Scortechinii* from Perak (Scortchini 216, Herb. Singapore) and find them perfectly identical. Both agree closely with Blume's figure of his *P. heterocarpum*, and I do not hesitate to reduce both names to synonyms of that species. According to modern rules of nomenclature this species must be named *P. heterocarpum* Bl.; *P. heterocarpum* (Bl.) Mett. (C. Chr., Ind.) must be called *P. Mettenianum* Cesati or *Selliguea heterocarpa* Bl.

Loxogramme subecostata (Hook.) C. Chr. comb. nov.

Polypodium subecostatum Hook., Spec., 5, 59, pl. 283 A.

Loxogramme Brooksii Copeland, Philipp. Journ. Sci., 9 C, 232. 1914; 11 C, 44, pl. 2 fig. 6. 1916.

PAHANG: Sedagong, Pulau Tioman (Henderson 18896).

An examination of the type-specimen of *P. subecostatum* Hook. in Kew from Sarawak, leg. Lobb, has shown that it is a genuine *Loxogramme*. Hooker's figure does not show the young linear submarginal slightly immersed sori, nor the velutinous roots so characteristic of this genus. *L. Brooksii* Copel. from Sumatra is certainly the same. It is probable that Ridley referred specimens belonging here to *L. lanceolata* (p. 104), under which name the specimen quoted was received. The species differs from *L. lanceolata* by its smaller size, much more coriaceous texture and the short sori being placed nearer the margin than the obscure midrib.

***Cyclophorus angustatus* Desv.**

To this species belong probably the sterile specimens from Perak (Kunstler 8275) referred by Beddome and Ridley (p. 98) to *C. heteractis* C. Chr., which species consequently is not known from the Peninsula.

***Cyclophorus varius* Gaud.**

C. pannosus Ridley 98.

SINGAPORE: Kranji (Ridley 6919, not 6419 as quoted by Ridley).

This specimen wrongly referred to *C. pannosus* by Ridley was rightly renamed *C. varius* by Holttum.

SCLEROGLOSSUM v.A.v.R.

This small genus was created by van Rosenburgh in 1912 (Bull. Jard. Buitenzorg, II S, XII, 39) and he referred to it three species: *S. debile*, *S. pusillum* and *S. sulcatum*, all previously considered species of *Vittaria*. The genus is very remotely, if at all, related to *Vittaria*, and forms with its sister-genus *Cochlidium* Klf. (*Pleurogramme* auctt.) of Tropical America, a distinct tribe of ferns, presumably of high age. The woody-coriaceous leaves, which are not articulated to the rhizome and apparently long-living, the peculiar light brown thin scales of the rhizome, hidden among the densely tufted leaves, lack of paraphyses, venation, and other characters make these species totally different from all *Vittariæ*. I shall discuss this genus in another paper, and here confine myself to mentioning briefly the species known from the Malay Peninsula. All species described are very closely related, and might naturally be regarded as forms of a single species.

***Scleroglossum debile* (Mett.) v.A.v.R., l.c.**

Vittaria debilis Mett.; Kuhn, *Linnaea*, 36, 67. 1869.

The smallest species; leaves rarely more than 3 cm. long, 1.5 mm. wide; veins simple; the sori short, near the

tip, not very deeply immersed, distinctly inframedial, the leaf edge outside the soral groove mostly broader than the costal parenchyma. Probably a small form of *S. pusillum*.

JOHORE: Gunong Panti (Holtum 17493). BORNEO.

Scleroglossum pusillum (Bl.) v.A.v.R., l.c.

Vittaria pusilla Bl. Ridley 108.

Leaves 5-10 cm. long, 3-4 mm. wide; veins forked or irregularly branching; sori in the upper third of the lamina, distinctly intramarginal, the inner edge of the soral groove acute and somewhat produced, the outer attenuate towards the edge and generally half as broad as the costal parenchyma. In specimens of this species one often finds scattered stellate brown hairs on the lamina; they are very deciduous and occur probably in all species.

MALACCA: Mt. Ophir (Ridley 9864). Singapore. Penang. Scattered through the Malayan region.

var. *intermedium* (Copeland)

Monogramme intermedia Copeland, Philipp. Journ. Sci., 1 Suppl., 255. 1906.

Intermediate between the type and *S. debile*, resembling the former in size, the latter by the inframedial sori with the leaf-edge beyond the soral groove about as wide as the parenchyma but thicker than in *S. debile*.

PERAK: (Scortechini). Philippines.

Scleroglossum crassifolium (Baker) C. Chr. comb. nov.

Vittaria crassifolia Baker, Kew Bull., 1893, 212.

V. sulcata Ridley, 108 (pro parte?)

Leaves up to 20 cm. long, 4-6 mm. wide, sometimes still larger, the upper half fertile, linear and generally narrower than the lower sterile half. Mouth of the soral groove marginal with the leaf edge not or very slightly protruding beyond the sorus. It is no doubt this form Ridley calls *V. sulcata*, which is a Ceylonese form with a distinct thick leaf-edge outside the sori; it is very doubtfully different from *S. pusillum*.

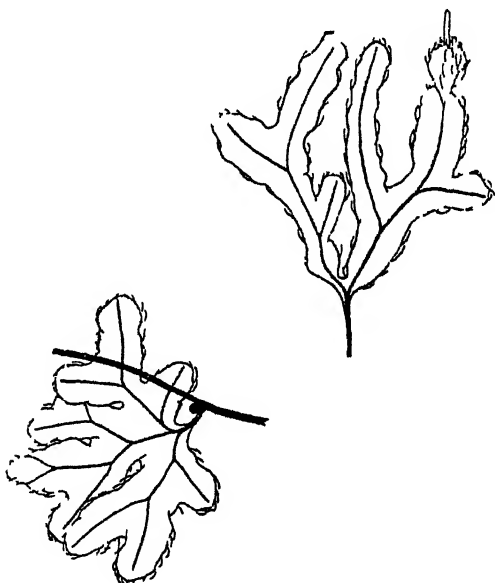
SELANGOR: (Ridley). BORNEO.

NEW SPECIES OF FERNS FROM THE
MALAY PENINSULA

By R. E. Holttum.

Hymenophyllum johorens Holttum, sp. nov.

Rhizoma tenue repens. Stipites 2-5 mm. longi, glabri. Frondes raro plus quam 1 cm. longae et 1 cm. latae; ramuli dichotomi fere regulariter; ramuli tertiarii plerumque praesentes, quaternati non visi. Ramuli ultimi 1.5-2 mm. lati, usque ad 9 mm. longi. Margines leviter crispatae, pilis simplicibus numerosis rufo-brunneis deciduis munitae.



Hymenophyllum johorens, x 2.5.

Valvae indusii extra pilosae, apice rotundatae, margine dentatae, dentes pilosi, basi angustatae et $\frac{2}{3}$ basin versus conjunctae; receptaculum tandem indusium longe 1 mm. superante.

JOHORE: Gunong Belumut, 3000 feet. (Holttum 10755), in a close mat on tree trunk, among liverworts.

Rhizome slender creeping. Stipes 2-5 mm. long, glabrous like the main veins. Fronds rarely more than 1 cm. by 1 cm.; branching almost equally dichotomous; branches of third order usually present, but of fourth order not seen. Ultimate branches 1.5-2 mm. wide, and up to 9 mm. long in unequally branched fronds. Edges slightly crisped, bearing numerous simple red-brown hairs, which are somewhat deciduous on old fronds. Valves of indusium with hairy outer surface, rounded above, and toothed, the teeth bearing

hairs like the edges of the frond; narrowed below and united for $\frac{1}{3}$ of their length, the base forming a conical sheath round the receptacle which in age projects 1 mm. beyond the indusium.

This is perhaps nearest to *H. borneense* Hk., of which I have seen the type at Kew. The latter species differs however in having more palmate fronds with more slender segments, which are very hairy, and the indusial lips are much smaller.

***Leptochilus simplicifolius* Holttum, sp. nov.**

Rhizoma repens, squamis brunneis non-nitidis, lanceolatis, munitum. Stipites conferti, frondis sterilis 5-10 cm., fertilis 20-30 cm., longi, in sicco pallidi, glabri. Frondes steriles simplices, herbaceae, glabrae, 10-25 cm. longae, 3-5 cm. latae, lanceolatae, basi cuneatae, apice acuminatae, margine undulatae. Venae laterales 5-10 mm. distantes, leviter obliquae, fere rectae, subtus prominentes, pallidae, glabrae; venulae fuscae, aerolas irregulares 2-3-seriatis inter venas primarias formantes; venulae liberae paucae. Frondes fertiles 8-10 cm. longae, 1-2 cm. latae, irregulariter crenatae.

PAHANG: Robinson's Falls, Cameron's Highlands, 4500 ft., on wet rocks (Henderson 17977: type); Fraser Hill, 3800 ft., on rocks by stream (Holttum 11489).

PERAK: Gunong Hijau, 4200 ft. (Burkill 12756).

Rhizome creeping, scales dull brown, lanceolate. Stipes closely placed, 5-10 cm. long in sterile fronds, 20-30 cm. in fertile fronds, slender, pale when dried, glabrous. Sterile fronds simple, 10-25 cm. long, 3-5 cm. wide, lanceolate, base cuneate, apex acuminate, edge undulate; lateral veins pale, prominent beneath, 5-10 mm. apart, slightly oblique, almost straight, glabrous. Veinlets dark, forming 2-3 rows of aerolae between the main veins with very few free included veinlets. Texture herbaceous. Fertile fronds 8-10 cm. in length, 1-2 cm. in width, rather irregularly crenate. Sori completely covering lower surface.

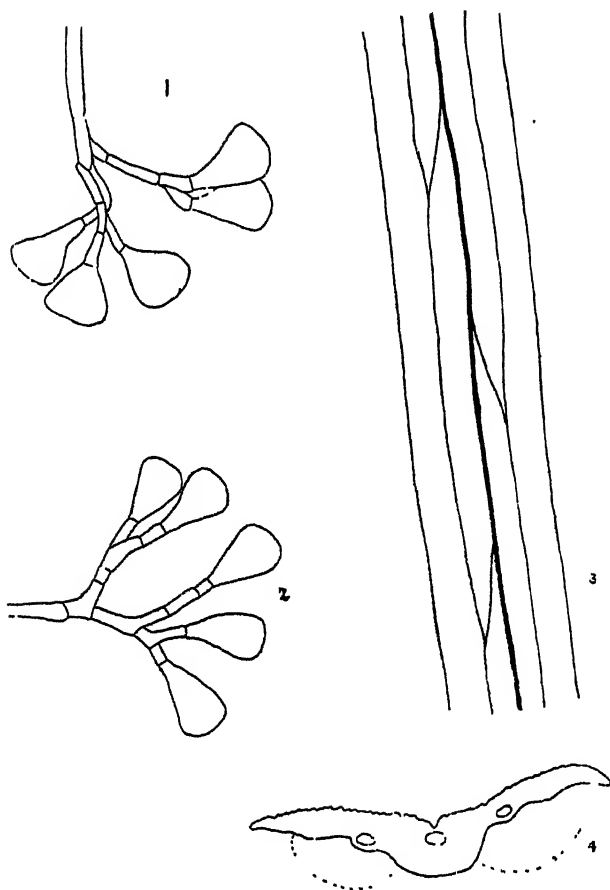
Nearly allied to *L. heteroclitus* (Pr.) C. Chr.

***Vittaria (Taeniopsis) malayensis* Holttum, sp. nov.**

Rhizoma breve repens, squamis angustis fuscis clathratis setosoacuminatis vestitum. Frondes confertae, sessiles, usque ad 25 cm. longae et 2 mm. latae, basin versus semisim contractae. Costa supra canaliculata, subtus leviter prominens. Venae laterales duae, sub sori, cum costa parallalae. Venulae paucae, obliquae, cum venis lateralibus confluentes. Venulae liberae nullae. Sori lati, paulo immersi inter costam et marginem, $\frac{2}{3}$ partem superiorem frondium occupantes, continui vel interrupti. Sporangia paraphysibus ramosis clavatis intermixta.

PAHANG: Fraser Hill, 4000 ft. (Burkill & Holttum 8705 (type), E. Smith 891); Cameron's Highlands, 4800 ft.

(Henderson 17702); Gunong Berumban, 5500 ft. (Henderson, F M.S. Mus. No. 11744).



Vittaria malayensis. 1 & 2, paraphyses, x 100. 3, venation, x 6. 4, transverse section of frond, showing position of sori, x 20.

Rhizome short-creeping, densely covered with narrow dark hair-pointed clathrate scales. Fronds closely placed, sessile, to about 25 cm. long and 2 mm. wide, very gradually narrowed to base. Midrib grooved above, slightly prominent beneath. Veinlets few, forming a single row of long aerolae between the midrib and a continuous vein lying below the sorus. No free veinlets. Sori in shallow grooves, occupying most of the space between midrib and edge, on the upper 2/3 of the frond, continuous or interrupted. Sporangia mixed with numerous branched paraphyses, the branches capitate. Spores about 64 to a sporangium. Stomata occur on the lower surface, on either side of the grooves occupied by the sori.

ADDITIONS TO THE FLORA OF THE MALAY PENINSULA.

STERCULIACEÆ.

Sterculia alata, Roxb. Hort. Beng. 50; Pl. Corom. iii, 84. t.287.

Kelantan, Gua Panjang at Gua Ninik, Henderson 19613; Perak, no locality, Scortechini 1783; Negri Sembilan, Senawang Reserve, Forest Department 1995.

Helicteres lanceolata, DC., Prod. i, 476.

Pulau Langkawi, Holttum 17430, August, 1925.

MELASTOMACEÆ.

Sonerila johorensis, Hend., sp. nov.

S. prostratae Ridl. affinis, sed foliis, antheris, petalisque majoribus differt.

Prostrate creeping herb, rooting at intervals, stems filiform, red with long white hairs. Leaves in subequal pairs, broadly triangular ovate acute, serrate, base broad and abruptly narrowed into the petiole, red below when alive, purplish when dry, white hairy above and below; up to about 15 mms. long and 10 mms. broad; petioles about 2 mms. long.

Flowers 2 to 4 on a terminal peduncle 2-3 cms. long. Calyx narrowly funnel shaped, 4 mms. long, teeth broad, acute. Petals pink, 6-8 mms. long, ovate oblong apiculate. Stamens 3, anthers yellow, curved, acuminate, 2 mms. long, filaments slender 3 mms. long. Capsule smooth or minutely hairy, cylindric oblong, narrowed at base, 5-6 mms. long.

JOHORE, Gunong Panti at 1600 ft. altitude, on rocks, Holttum 17500 (type), Feb. 1926.

RUBIACEÆ.

Pomazota rivularis, Hend., sp. nov.

A *P. sylvestre* Ridl., foliis maioribus minus hirsutis, stipulis latioribus, corolla cylindrica, stylo tenuiore differt.

A creeping and erect herb, woody at base, stems at base as much as 8 mms. through, rooting at lower nodes.

Leaves oblong-lanceolate or oblanceolate, acute, narrowed to base, up to 18 cms. long and 6.5 cms. broad, glabrous above except for a few coarse thick hairs between the nerves, sparsely hirsute below on the midrib and nerves, margin with a row of multicellular hairs. Nerves prominent on both sides, up to 17 pairs. Stipules broad triangular-ovate with long points.

Peduncles variable in length, reaching 6 cms., subtended at base by a pair of ovate acute bifid bracts hairy on their edges. Involucral bracts broadly oblong or rhomboid, 3-nerved, sparsely hairy, up to 2 cms. long and 1 cm. broad. Outer floral bracts narrow spatulate, 6-8 mms. long with long multicellular hairs. Inner floral bracts linear oblong,

also hairy. Calyx lobes 4, narrow oblong with long multicellular bristles on their edges. Corolla white, cylindric, 4 mms. long, constricted below the lobes, mouth with a dense ring of hairs; lobes 4, patent, triangular ovate, with a strongly marked midrib from which arise two or three multicellular bristles. Stamens 4, about half the length of the corolla tube, anthers oblong. Style slender, stigma large globose, prolonged below the insertion of the style into two lobes. Disc conspicuous.

Capsule ovate oblong 2-3 mms. long, crowned by the persistent calyx lobes. Seeds small, numerous, angular, punctate.

JOHORE: Gunong Muntahak, c.600 ft., by a stream in dense shade, abundant, Holttum 19922 (type), March, 1928.

COMPOSITÆ.

Eupatorium conyzoides, Vahl, Sym. Bot. iii, 96.

A Brazilian composite of recent introduction into the Peninsula, now common on roadsides near Taiping.

LOGANIACEÆ.

Fagraea speciosa, Bl. Rumphia ii, 35, t. 81.

Kelantan, Sungai Ketei at Gua Ninik, Henderson 19658, October 1927.

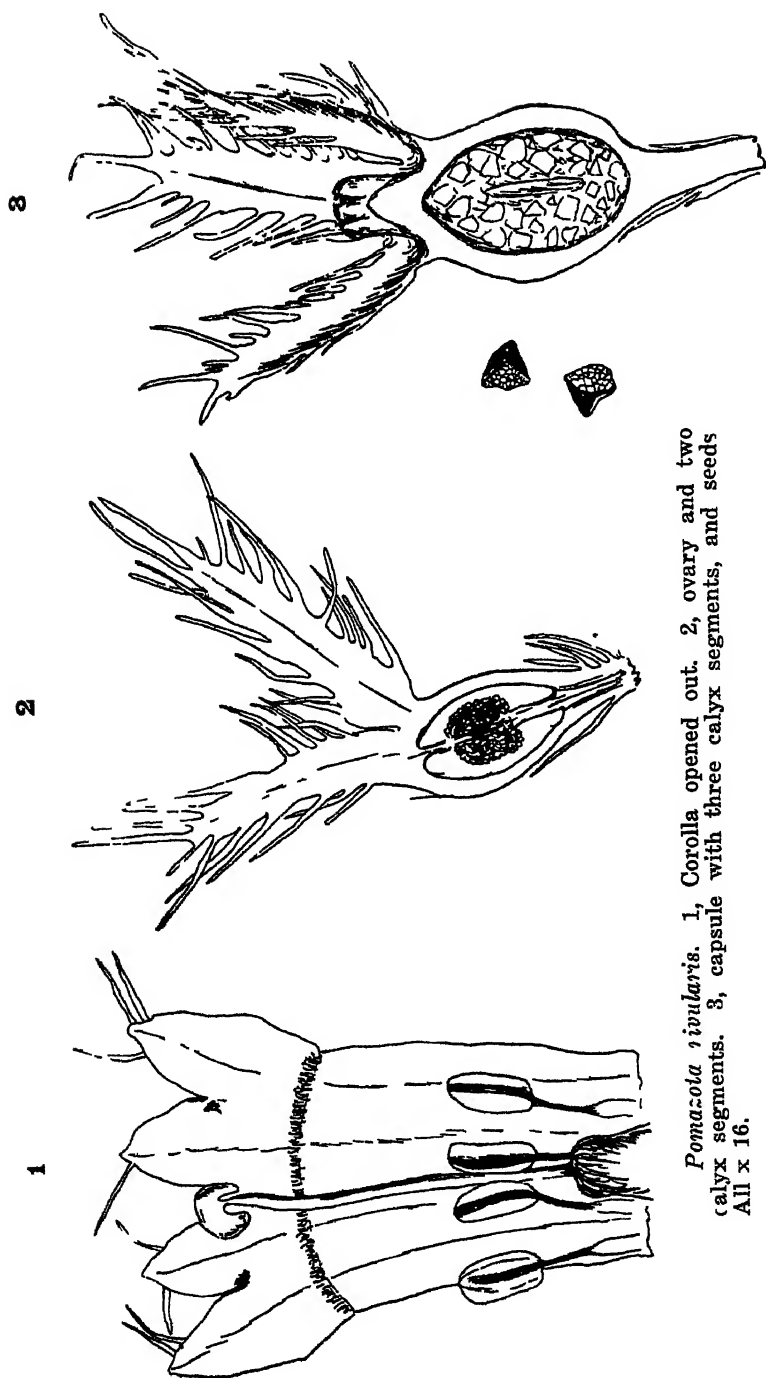
GESNERACEÆ.

Loxocarpus Holttumi, Hend., sp. nov.

L. semitortae Ridl. affinis, foliis cordatis, latioribus, pedunculis longioribus, calycis majoribus, pedunculis floribusque extra glanduloso-hirtis differt.

Leaves in a rosette, broadly ovate, cordate, blunt, edge serrulate, upper surface covered with white silky hairs, lower surface densely covered on the prominent veins with long slender ferrugineous hairs, between the veins more sparsely covered with short white hairs; about 4-5 cms. long and 4 cms. broad. Petioles up to 5 cms. long, densely ferrugineous hairy.

Peduncles to 15 cms. or more, covered with short purple glandular slightly viscid hairs, pedicels drooping, 1.2 cms. long. Inflorescence of about 7 flowers. Sepals triangular, blunt, 1 mm. long, hairy as the peduncle and pedicel. Corolla uniformly pale mauve-blue, slightly paler at the base, two-lipped, lobes round blunt, the two upper lobes much smaller than the three lower ones; 13 mms. long and broad. Outside of corolla sparsely white glandular-hairy. Filaments rather slender, curved, white to greenish, anthers yellow, or the same colour as the corolla, connivent. Staminodes white, club-shaped, about one-third the length of the stamens.



Pomazola vivularis. 1, Corolla opened out. 2, ovary and two calyx segments. 3, capsule with three calyx segments, and seeds. All x 16.

Capsule conic, dehiscing along the upper edge, sepals persistent, reflexed. Seeds brown, narrowly ovoid and pointed at both ends, minutely reticulate.

JOHORE, Gunong Pantl at 1600 ft. altitude on rocks, Holtum 18097 (type), Feb. 1926; same locality, Holtum 19863, Dec. 1927.

ORCHIDACEÆ.

Eria rigida, Bl. Mus. Bot. Lugd. Bat. ii, 183.

Pahang, Gua Tipus near Chegar Perah, Henderson 19465, Oct. 1927.

Eria Teysmanni, J. J. Smith in Bull. Dép. Agric. Indes Néerl. xxii, 29.

Kelantan, Kuala Pertang, Haniff and Nur 10364, February 1923.

M. R. Henderson.

FURTHER ADDITIONS TO THE FLORA OF THE MALAY PENINSULA.

(1) *HYPTIS CAPITATA*, Jacquin in *Collectanea I* (1786) 102.

Pycnanthemum decurrens, Blanco, in *Flor. Filip. Ed.* 3, II (1878) 251, t. 294.

A stout annual herb, erect, 4 feet tall, hairy, green, or purplish especially at the nodes and in the upper side of the leaf-mid-veins, with four-angled stem. Leaves lanceolate, toothed, about 4 inches long, and 1 inch broad. Flowers numerous, crowded into subglobose heads, on long peduncles, peduncles solitary, axillary, four-angled, about 3.5 inches; heads 0.5 to 0.7 inch long. Calyx pale green. Corolla white, dotted pink in the tube, inferior lip yellowish white. Stamens exsert; filaments white; anthers darkish; pollen yellow. Style linear, white, exsert.

This plant is quite common in waste places along the Cluny Road, in the vicinity of the Old Arboretum of Singapore, and has been observed there for the last five years. The plant agrees well with plate given in Blanco's *Flora*, l.c.

Distribution—A plant of Mexican origin now found as a weed in the Marianne and Caroline Islands, the Philippines, Formosa, Amboina, Java, Borneo and India.

The key given in Ridley's *Flora II* (1923) 645, for the identification of *Hyptis* spp. occurring in the peninsula may be modified to include the above species thus:—

A. flowers few in racemose cymes, corolla violet; herb strongly aromatic, pubescent with spreading hairs; leaves ovate, serrulate. *H. suaveolens*, Poir.

AA. flowers numerous in axillary globose or subglobose heads, corolla white; herb little or not aromatic, more or less pubescent with non-spreading hairs; leaves ovate-oblong to lanceolate, serrate:

(a.) Peduncles about 0.5 inch long, more or less as long as the flower heads. *H. brevipes*, Poir.

(aa.) Peduncles 3.5 inches long, about three or more times as long as the flower heads. *H. capitata*, Jacq.

(2) *RIVINIA HUMILIS*, Linn. *Spec. Plant.* (1753) 121; H. Walter in *Engl. Pflanzenreich IV* 83 (1909) 102, fig. 30; Sims in *Bot Mag.* (1816) t. 1781.

Perennial herb or shrub, woody below, up to 3.5 feet tall, glabrous or pubescent. Leaves alternate, occasionally sub-opposite, entire, ovate or broadly elliptic, apex long acuminate, base rounded or obtuse, sometimes slightly acute or sub-cordate, 1 to 4 inches long, 1 to 2 inches broad; petiole more or less hairy or tomentose, roundish, with a little groove above, 1 to 1.5 inch long. Flowers bisexual in subterminal or axillary racemes, little longer or shorter than the leaves.

Perianth of a single series, 1 cleft, white or pinkish, 1 1/2 inch long, increases and turns green in fruit. Stamens as many as perianth segments; filaments white, persisting green on fruits. Ovary monocarpellary, white, style one, short with capitate, white stigma. Fruit a globose red berry, with fleshy pericarp; seed hard, black.

Varieties occurring here *orientalis* (Moq.) Walt. and *canescens*, L.

As early as the year 1890 (or 1896?) Ridley collected a specimen of this species which was then noted by him as an escape from the Singapore Botanical Gardens. This species is still found persisting as weed in the Garden's hedges and is seen flowering and fruiting throughout the year. The other records for the Peninsula are:—

Malacca at Malacca Hill (Ridley, Dec. 1899). Singapore, Yo Chu Kang (Ridley, 1902); Paya Goyang (Hassan, May, 1905).

Singapore, (Mayer, no. 884 fide Walter l.c.) [Mayer's name is not included in the list of Malayan Plant Collectors made by Burkill and published in Garden's Bulletin IV (1927) nos. 4 and 5].

Distribution—Native of tropical and subtropical America, but now pantropic.

Rivina (also spelt as *Rivinia*) is a Linnean genus of the *Phytoloccaceae*—a family not included in Ridley's *Flora*.

For the purpose of tracing the family of this plant, the following synopsis may be used as an Addendum to the synopsis of the families given by Ridley in the *Flora*, I (1922) xxxi:

CXa—*Phytoloccaceae*—Herbs or shrubs, woody at base. Perianth of a single series, 4-cleft. Leaves alternate, entire. Ovary of one carpel. Style one, capitate stigma. Fruit a berry.

C. X. FURTADO.

OCIMUM, LINN. IN THE MALAY PENINSULA.

In the peninsula all *Ocimum* species are cultivated plants, but frequently one comes across them as escapes and weeds in the settled areas. They are grown chiefly for the purposes of worship or for their medicinal value, or again for the purpose of scenting cooked preparations. *O. sanctum*, L., is sacred to the Hindu deities Krishna and Vishnu, and is frequently cultivated by the Hindus from northern India near their dwellings, in places where they usually say their prayers. Some believe that the mere presence of the *Ocimum* round about the houses keep away mosquitoes. An infusion of its leaves is used, either alone or mixed with that of other plants, internally to cure the minor disorders of the respiratory system and also irregular

menstruation in women, and externally as a cure for skin diseases, headache and earache. Medicinally leaves of any of the *Ocimum* species are considered good, but leaves of *O. sanctum*, L. and *O. Basilicum*, L. are regarded as superior to others. Leaves of *O. canum*, Sims, and of the white-flowered, hairy varieties of *O. Basilicum*, L. are used in culinary preparations. The leaves and calyces of *O. Basilicum*, L. var. *pilosum*, Benth. has been reported to be a frequent adulterant of the patchouly (*Pogostemon Cablin*, Benth.) prepared for export from this country. [Gildemeister & Hoffmann in the *Volatile Oils* Engl. Ed. (1900) 657; and Prain in *Journ. As. Soc. Bengal* LXXIV pt. 2 Extra No. (1907) 702 & 709]. In his notes on the Malayan drugs, Ridley notes that the flowers of *O. Basilicum*, L. form one of the ingredients used in the root decoction of *Phyllanthus Niruri*, L. given to cure cough in children, and that an infusion of the seeds of *O. gratissimum*, L. is drunk for gonorrhea, and also in the morning as laxative. (*Agri. Bull. S.S. & F.M.S.* V,—1906—248 & 278.)

Being introduced plants in the peninsula, the Malays have no fixed vernacular name for the *Ocimum* species. *Kemangi* is the usual name for *O. canum*, Sims, but it may also be used for the white-flowered varieties of *O. Basilicum* that are used in cooking. *Selasi* or *Selaseh*, a corruption of the Sanskrit name *Tulasi* for the *Ocimums*, *Pokoh* derived from the Chinese name *Poh Hok* for peppermint, and *Ruku* are used indiscriminately to all the species of the *Ocimum*, but rarely to *O. canum*, Sims. The last two names are usually used in the plural form as *Ruku-Ruku* and *Pokoh-Pokoh*, the singulars being seldom used. As in the Malay language the plural form, when applied to plants, usually implies that the plants bear in some way a resemblance to the one to which the singular belongs, the genuine *Ruku* may be some other plant native of Malaya, as for instance, the aromatic *Adenosma capitatum*, Benth., which is now known to the Malays as *Ituku hutan*. The word *Kemangi* is usually used alone, but all the others may be applied alone or with the adjective *merah*, *hitam*, *putih* or *besar* to describe the general size or colour of the plants in the living condition. *Oku* or *Oku-Oku*, are apparently corruptions of the *Ruku* or *Ruku-Ruku*. The white-flowered, hairy varieties of *O. Basilicum*, L., approach so near to *O. canum*, Sims, that botanically it is very difficult to separate them as distinct species except by the larger size of all the parts of *O. Basilicum*, L. The Malays also do not seem to make any difference between them, and the varieties of *O. Basilicum*, L. have the same vernacular name and uses as *O. canum*, Sims. All the above names are also applied by the Malays to *Hyptis suaveolens*, Poir, another aromatic plant of foreign origin belonging to the same family as the *Ocimums*. The most usual adjective that accompanies the

names in this case is *hutan* to show that the plant is a weed or wild in the Peninsula.

The key and the descriptions of *Ocimum* species given by Ridley in the *Flora of the Malay Peninsula* II (1923) 643, are not very satisfactory for the identification of the species occurring in the peninsula, and hence the key given below has been prepared after a study of the plants in the herbarium as well as in the living condition.

KEY.

1. a. Shrubby plants 1 to 2 m. tall. Leaves more than 7.5 cm. long, 5 cm. wide, broadly serrate. Lower calyx lip shorter than the upper one. Corolla white, pubescent....
.....*O. gratissimum*.

b. Herbs or woody undershrubs, 30 to 100 cm. tall. Lower calyx lip longer than the upper one. Leaves usually less than 6.5 cm. in either dimensions, entire or serrate
..... (2)

2. a. Leaves somewhat rhomboidal, obtuse, often apiculate, hairy on both sides. Pedicels as long as, or longer than, the calyx, spreading out almost at right angles to the axis so that the calyces face outwards. Calyx glabrous within. Stem often reddish pubescent with spreading, white hairs. Corolla purplish, pink or white with purplish or pink lobes, or yellowish lip (fide Ridley) Anthers yellow
.....*O. sanctum*.

b. Leaves acute or acuminate at both ends, rarely with an obtuse apex. Pedicel shorter than the calyx, growing upwards closely adpressed to rachis so that the calyces on decurved tips face downwards and appear sessile. Calyx hairy within; patellate lobe obstructs the view of the remaining parts. Anthers white..... (3)

3. a. Corolla white, 4 to 5 mm. long. Patellate lobe of the calyx 2.5 to 4 mm. long and as much broad. Leaves 2.5 to 4 cm. long, acute at both ends or rhomboidal. Plant pubescent often densely in the upper parts, low branched, 30 to 45 cm. rarely 60 cm. tall herbaceous, whitish without any purplish tints.....*O. canum*.

b. Corolla white, purplish or pink, 7.5 to 12 mm. long. Patellate lobe of the calyx 5 to 7 mm. long, 6 mm. broad. Leaves 2.5 to 7.5 cm. long, very variable, usually lanceolate, cuneate at base, or hairy glabrous plant 45 to 90 cm. tall, branching in the upper two-thirds, bushy, sometimes hairy but usually glabrous, and purple with dark purplish tints even in the calyx.....*O. Basilicum*

(Polymorphous species).

O. gratissimum, Linn.

Lower Siam, Kopah (Haniff & Nur, n. 2987) Perak, Sungei Siput (Haniff & Nur, n. 6923) Singapore, Botanic

Gardens, (Ridley, in 1905; Deshmukh, in 1921; Furtado, in Nov. 1927, known in the vernacular as *Ruku-Ruku hitam*, and *Selaseh besar*).

O. sanctum, Linn.

Langkawi, (Curtis, n. 2126). Perak, Matang, (Wray, n. 558, as Selassay). Province Wellesley, Pagar Tras, (Ridley, n. 7168); Prai, (Nur, n. 6226). Pahang, Pekan, (Ridley, as Selaxa antan and no. 187); Kuala Tahan, (Seimund, n. 831). Malacca, Gombeya Bath, (Hervey, Sept. 1890). Selangor, Kuala Lumpur, (Ridley, n. 10214); Port Swettenham, (Burkill, n. 2700). Johore, Pulau Tingii, (Burkill, June 1915, as Oku). Singapore, (Hullett, in Nov. 1884 n. 374; Ridley, in 1903, as Ruku-Ruku); Pulau Ubin, (Furtado, n. 18622); Botanic Gardens (Furtado, Nov. 1927, as *Selaseh hitam* and *Ruku-Ruku merah*).

O. canum, Sims.

Langkawi, (Curtis, n. 2492). Perak, Kuala Kangsar, (Haniff n. 14930) Singapore, (Hamilton, in Oct. 1926, as Kemangi); Botanic Gardens, (Ridley, in Aug: 1898; Furtado, in Aug: 1928, as Kemangi). This plant frequently appears for sale in the Singapore bazars, as also the white-flowered hairy varieties of *O. Basilicum*, L. known to the Malays as the Kemangi.

O. Basilicum, Linn.

Penang, Tanjong Tokong, (Curtis, n. 2492); Waterfall Gardens (Nur, in Sept. 1918) Selangor, Kuala Lumpur, (Ahmat in 1889, as Kemangi). Pahang, Kuala Tembeling, (Ridley, in Aug: 1891); Pulau Tioman, (Henderson, n. 18428). Malacca, Bukit Panchur, (Alvins, as Ruku-Ruku Itam). Singapore, (Ridley, in 1903, as Selasih); Bukit Mandai, (Ridley, as Ruku-Ruku); Botanic Gardens, (Furtado, in Nov. 1927, as *Selaseh puteh*, *Selaseh hitam*, *Pokoh*, *Pokoh-Pokoh hitam*, and *Kemangi*).

C. X. FURTADO.

PALAEQUIM STELLATUM, KING & GAMBLE.

PALAEQUIM STELLATUM, King & Gamble in *Journ. As. Soc. Bengal* LXXIV, pt. II (1905) 198; Ridley in *Flor. Mal. Pen.* II (1923) 277; and H. J. Lam in *Bull. Jard. Bot. Buitz.* VII (1925) 71 and VIII (1927) 402.

Bassia Watsoni, Ridley l.c. p. 267.

Madhuca Watsoni (Ridl.) Lam l.c. VII (1925) 179 and VIII (1927) 462.

In the *Materials for a Flora of the Malayan Peninsula*, King and Gamble (l.c.) used Scortechini's specimen numbered 1855, from Perak, to found a new species which they called *Palaquium stellatum*. The specific name for the plant was suggested by Scortechini himself who

thought the hairs on the leaf-nerves were stellate. Having probably no occasion to test the accuracy of Scortechini's observations regarding hairs on the leaf nerves, King and Gamble retained the specific name suggested by the Schortechini whom they also held responsible for the description of the hairs. A co-type specimen of the number cited by King and Gamble is in the Singapore herbarium. It answers to the description of the species in all respect except the hairs on the leaf-nerves, which are not stellate. In his monographic work on the sapotaceous plants of the Dutch East Indies, the Malay Peninsula and the Philippines, Lam points out this error in the description of the hairs on the leaf-nerves of *P. stellatum*, and adds that he has never come across a *Palauquium* species having stellate hairs on leaves (Lam, l.c. VII, p. 71). Hitherto *P. stellatum* was believed to occur in the Malay Peninsula only, and to be very rare. But from the citations given by Lam (op. cit. VII, p. 71, and VIII p. 402) one notes that it is not so rare in the Peninsula, and that it also occurs in Sumatra.

In working out the sapotaceous plants for his Flora, Ridley was not able to see the type specimen of *P. stellatum*, and so he borrowed the specific description for the Flora from the original description in the Materials (Ridley, l.c. p. 277). He had, however, with him unnamed material of this species, which he used to found his *Bassia Watsoni* (l.c. p. 267). He does not cite the numbers of the type specimens, but thanks to Mr. Burkill who has looked them up at Kew, we know that the type specimens of *Bassia Watsoni*, Ridley, are C. F. nos. 869 and 2755, both of which numbers are represented in the Singapore herbarium. An examination of this material leaves no doubt that it is *Palauquium stellatum*, King and Gamble, though the leaves resemble somewhat of the *Bassia* group. The calyx is distinctly of six sepals, and Ridley himself had noted correctly that the outer whorl consists of three sepals, whereas the *Bassia* (*Madhuca*) species have two sepals in the outer whorl of the calyx. The cotype specimens of *Bassia Watsoni* in the Singapore herbarium closely agree with the type specimen of *Palauquium stellatum* and with its description as corrected by Lam.

While working on the sapotaceous plants in Malaysia, Lam (op. cit) could not see any authentically named specimen of *Bassia Watsoni*. But considering that the generic name *Madhuca*, GMELIN, is the only valid name for the *Bassia*, KOENIG, the word *Bassia* being preoccupied by ALLIONI for a group of Chenopodiaceae, he renamed *B. Watsoni*, Ridley as *Madhuca Watsoni* with a note indicating his doubts of its being a true *Madhuca* (op. cit. VII, p. 179). Later on he had with him a specimen collected by Watson at Baloh Reserve, numbered C. F. 2755, which he determined

correctly as *Palaequium stellatum* (l.c. VIII, p. 402); but he did not know that this was from the type collection cited by Ridley for *Bessia Watsoni*. Lam., therefore, still retained the name *Madhuca Watsoni* in this later publication with a note that he has not seen any specimen of the species. (l.c. VIII, p. 462).

C. X. FURTADO.

SPECIES OF NEESIA IN THE MALAY PENINSULA.

The primary object of this note is to restore to its proper rank, the species *Neesia synandra*, Masters, the specific status of which has long been in doubt, and also to show the limits of distribution of all the three species found in the Malay Peninsula. That Masters had made a careful examination of the type specimen of his species is quite clear from the generic characters given by him under *Neesia* in Hook f. Flor. Brit. Ind. I pt. 2 (1874) 352, which, as far as the leaves and flowers were concerned, were all a result of his own observations made of the type specimen of his species. But the confusion occurred owing to a mistake he made in giving almost all the important characters of his species under the generic description, where they escaped the attention of the botanists who tried to study his species, giving the minor ones under the description of his species. It was probably his intention to show the characters of the genus *Neesia* as he had found it in the Malay Peninsula; for he was fully aware that his generic description was not applicable, at least in the characters of the filaments, to *Neesia altissima*, Bl., the only other *Neesia* species known then; in fact he himself draws attention to this fact under the description of his species. The result of the transference, which Masters unwittingly made, of the important specific characters to the generic description was that *Neesia synandra*, Mast., was either regarded as a doubtful species, or confused with others quite distinct. Hence a detailed description of *Neesia synandra*, Mast., and a sufficient synonymy of all the three species occurring in the peninsula together with an artificial key are given below so as to make their distinctions and their specific ranks quite clear.

KEY.

1a. Leaves up to 24 x 12 cm., glabrous with 12-15 pairs of nerves. Flowers in the axils of fallen leaves. Peduncle 0.2 cm. thick, pedicels 1-2 cm. long. Calyx globose in the bud abruptly contracted towards the apex, later somewhat compressed with margins inflexed inwards, not involute
.....*Neesia malayana*.

1b. Leaves over 30 x 15 cm. glabrous to distinctly hairy beneath, with 18-26 pairs of nerves. Flowers axillary, or in the axils of fallen leaves. Peduncle 0.3-0.4 cm. thick;

pedicels up to 1 cm. long. Calyx globose in the bud contracted or not towards the apex, later saucers shaped with margins involute or not.....(2)

2a. Leaves up to 45 x 17 cm. glabrous or subglabrous. Branchlets and petioles hairy or glabrous, rarely covered with a few scales. Stipules glabrous, subglabrous or rarely with a few scales. Flowers axillary or in the axils of fallen leaves. Calyx globose in the bud abruptly contracted towards the apex, later saucers shaped with involute margin, wholly or partly pubescent within.....*N. altissima*.

2b. Leaves over 45 x 20 cm. distinctly hairy beneath. Branchlets and petioles scaly, not hairy. Stipules thickly covered with scales outside, tomentose within. Flowers in the axils of fallen leaves. Calyx globose in the bud with cuneate apex, later convexly saucers shaped with margin spreading, not involute, glabrous within.....*Neesia synandra*.

Neesia synandra, Masters in Hook. f. Flor. Brit. Ind. I pt. 2(1874) 352; Mast. in Journ. Linn. Soc. Bot. XIV(1875) 504; Becc. Malesia III (1889) 263; King Mat. Flor. Mal. Pen. in Journ. As. Soc. Beng. LX, pt. 2(1891) 56, reference to Maingayi's specimen only; Ridl. Flor. Sing. in Journ. Roy. As. Soc. Str. Br. XXXIII(1900) 51 pro parte; Ridl. Flor. Mal. Pen. 1(1922) 265 pro parte; Merr. in Journ. Roy. As. Soc. Str. Br. LXXXVI(1922) 328?

Arbor c. 20 m alta, 60-70 cm. diametro. Ramuli crassi, tereti, inferne delapsu foliorum conspicue cicatrisati, glabri, superne foliosi, lepidoti. Folia alterna, petiolata; stipulis deciduis, foliaceis, sessilibus, lanceolatis uni vel obsolete multi-nerviatis, 5 cm. longis, extus squamatis, intus tomentosis; petiolo usque 10 cm. longo, 0.7 cm. crasso, lepidoto, terele, basi dilatato trigono, apice inflato; lamina adulta 45-55 cm. vel magis longa, plus 20 cm. lata, coriacea obovato-oblonga, basi attenuata, saepissime cordulata, raro rotundata, apice semper emarginata, margine integra subundulata supra glabra costis nervisque sparse pilosis exceptis, subrugosa, dense punctulata, subtus aspera, pilosa, costis nervisque lepidotis exceptis; juvenilis utrinque dense tomentosa subtus costis nervisque lepidotis exceptis; nervis (lateralibus) 20-24 parallelibus, prope marginem arcuatis, in pagina superiore depressis, inferiore valido-prominentibus. Inflorescentia subterminalis, ad axillas foliorum delapsorum, corymboso-multiflora divaricata, usque 3.5 cm. longa. Pedunculi ad singulum pulvinum 1-3, ramosi, densissime squamati, angulati, basi 0.4 cm. crassi; bracteis minimis (0.3 cm. longis), densissime lepidotis, caducissimis. Pedicelli usque 1 cm. longi, angulati, densissime lepidoti. Involucellus trilobatus, caducus, extus lepidotus, intus glaber. Calyx primum globosus, apicem

versus sensim angustatus, sub anthesi convexo-disciformis margine obsolete crenulato, haud fisso, haud involuto, extus squamis densissime obtectus, intus glaberrimus, circiter 1-1.5 cm. diametro, persistens. Corolla pentapetala, petalis liberis, contortis, in calyptram cohaerentibus, mox deciduis, utrimque obtusis, extus basi glabro excepto timentosis, intus glabris, 1 cm. longis, 0.4 cm. latis. Stamina numerosa (120-30), monadelpha, in 5 acervos obsolete divisa, quam corolla breviora, omnia fertilia; filamentis ad medium connatis; antheris extrorsis, bilocularibus visu. Pistillum stamina superans, 0.7 cm. longum; stylo brevi, tereti, glabro; stigmatibus crasso, capitato secus marginem minute puberulo; ovario subsessili, quinqueloculari, oblongo, ciliato. Fructus pedunculatus; immaturus quinquangularis obovatus basi apiceque obtusus, pyramidato-tuberculatus; submaturus partim virescens partim purpurascens, muricatotesselatus, quinquejugatus, sectione transversa stellatus, 15 cm. longus, ellipticus, apice obtusus, ima basi acutus; maturus ad angulos prominentes ad apicem valvatim dehiscens; valvis 5, lignosis, medio septiferis, basi connatis, superne hiantibus, extus lividis, intus pilis rigidis prurientibus luteis densissime tectis, ad margines axiales plures semines utrimque ferentibus; seminibus ellipsoideis, apice obtusis, basi cuneatis, horizontalibus, nudis, nigris, usque 2 cm. longis, 1 cm. crassis. Indumentum pro magis parte stellulatum. Squamae peltatae.

Tree about 20 metres tall, 60-70 cm. through. Branchlets thick, terete, marked with conspicuous scars of fallen leaves, glabrous, but covered with scales in the terminal leaf-bearing parts. Leaves alternate, petioled; stipules deciduous, foliaceous, sessile, lanceolate, one or obscurely many-nerved, 5 cm. long, scaly outside, tomentose inside; petiole up to 10 cm. long, 0.7 cm. thick, scaly, terete, dilated trigonal at base, inflated at apex; adult leaves 45-55 cm. or more long, more than 20 cm. broad, coriaceous, obovate-oblong, narrowed into a very often cordulate, rarely obtuse, base, always with an emarginate apex, with entire, slightly undulate margin, glabrous above except for a few hairs along the midrib and nerves, and minutely and thickly punctate; in the under surface rough and hairy except for the scaly midrib and very often scaly nerves; nerves (lateral) 20-24 pairs, parallel arched near the margins, sunk above, raised beneath. Corymbs many-flowered, divaricate, subterminal, in the axils of fallen leaves, up to 3.5 cm. long. Peduncles 1-3 on each pulvinus, branched, densely covered with scales, angled, 0.4 cm. thick at base; bracts small (0.3 cm. long), thickly covered with scales, caducous. Pedicels up to 1 cm. long, angled, thickly lepidote. Epicalyx trilobed, caducous, scaly outside, glabrous within. Calyx globose in the bud, with gradually cuneate apex, later dilated and compressed into a convex disc with obscurely crenulate, but

not split nor involute, margin, thickly coated with scales outside, glabrous within, about 1–1.5 cm. in diameter, persistent. Petals 5, contorted, free but cohering together, deciduous, obtuse at base and apex, 1 cm. long, 0.4 cm. wide. Stamens numerous (120 to 30) monaldehyous, but obscurely arranged in 5 bundles, shorter than the corolla, all fertile, each bundle alternate with the petals, divided half-way into numerous filaments; anthers apparently all bilobed, extrorse. Pistil longer than the stamens, 0.7 cm. long; style short, terete, glabrous; stigma thick, capitate, minutely puberulous along the margins; ovary subsessile, oblong, 5-locular, ciliate with long persistent hairs; ovules numerous 2-seriate, horizontal, anatropous. Fruit peduncled; very young pentagonal, obovate obtuse at base and at apex, covered with pyramidal spines all over; half-ripe fruits partly green and partly purplish faintly suffused with blue, muricate-tessellate, 5-ridged, star-shaped in transverse section, 15 cm. long, elliptic, obtuse at apex, cuneate at the very base; ridges 6 cm. high from the axis of the fruit, the furrows 2.5 cm. deep; mature fruits open along the ridges into 5 valves; valves woody, carrying the septum in the middle, united at the base, opened at apex, blue-black outside, densely covered within with rigid, stinging, yellow hairs; seeds many, borne horizontally on both sides along the axial margins of the valves, ellipsoid, obtuse at apex, cuneate at base, smooth, naked, black, up to 2 cm. long, 1 cm. thick. Hairs on the vegetative parts of the plant mostly stellate; scales always peltate.

PENANG, Sungei Telok Bahang (Burkill, n. 4556, flrs. in Feb. 1919); Telok Bahang, (Forest Guard under Curtis, n. 3081 leaves only); Penara Bukit, (Forest Guard under Fox, flrs. in March 1905).

SELANGOR, Weld Hill in Kuala Lumpur (Hamid no. C.F. n. 2301 leaves only).

SINGAPORE, Bukit Timah, (Ridley, flrs. and very young fruits in Feb. 1890; ripe fruits in Oct. 1904 and Sept. 1908; Holttum & Furtado, n. 19788, flrs. & fruits in all stages in Nov. 1928).

Distribution—Borneo?

I have not seen the Bornean specimen referred to by Merrill, but he says that it agrees in its vegetative characters with Fox's specimen from Penang, which is *N. synandra*, Mast. He describes its fruits (not quite mature) as ellipsoid, 20 x 10 to 12 cm. when dry.

Neesia altissima (Bl) Bl. in Nov. Acad. Cur. XVII (1835) 75 & 83, t. 6; Becc. Malesia III (1889) 261; Bakhuizen in Bull. Jard. Buitz. VI (1924) 221 & 246 (for fuller bibliography and synonymy of this species see this work).

Esenbeckia altissima, Bl. Bijdr. Flor. Ned. Ind. 1 (1825) 119.

Neesia ambigua, Becc. Malesia (1887—1889) 261, t. 31 fig. 1.

Neesia glabra, Becc. 1. c. 263, tt. 30 et 31 figs. 2—4.

N. synandra, Mast. sensu King Mat. Flor. Mal. Pen. in Journ. As. Soc. Beng. LX, pt. 2, (1891) 56, exclusive of reference to Maingay's specimen; Ridley Flor. Mal. Pen. I(1922) 265 pro parte.

PERAK, Sungei Larut (Wray, n. 2271, flrs. in July 1888; n. 2875, small fruits in Aug. 1888); Gopeng (Kunstler, n. 5768, fruits in April 1884); Batu Kurau in Taiping (Haniff, n. 13265, flrs. in May 1924); Tukang Sidin in Teluk Anson (Haniff, n. 14161, young fruits in Sept. 1924); Bagan Serai in Krian, (Mitchell, C.F. n. 5679, flrs. in April and fruits in June of 1922, vern. name Bengang).

Distribution—Lower Siam, Borneo, Java, and Sumatra.

I have taken the name *N. altissima*, Bl., sens. lat., to include the various forms or varieties of this species. Wray n. 2271 has an obscurely 3–5 lobed epicalyx glabrous within except for a thin tomentose ring at base, petals lightly tomentose in the upper half and glabrous in the lower half and along the margins and inside, and glabrous stigma. Haniff's n. 13265 has a deeply trilobed, larger epicalyx tomentose within, petals tomentose outside almost to the base and pilose stigma as in Bakhuizen's specimen n. 5884 cited under *var. typica*, Bakh. l.c. 246. The specimen from Lower Siam (Haniff and Nur, n. 3905, from Khaw Poh Hill, flrs. in Dec. 1918) has its epicalyx like Wray's specimen, but the petals and the stigma as in Haniff's specimen. *Neesia* has not been credited for Lower Siam even in Craib's list of the Siamese plants (Flor. Siam. Enum. 1925, pt. I).

Neesia malayana, Bakh. in Bull. Jard. Bot. Buitz. VI (1924) 221 et 247, tt. 34 et 35.

Neesia synandra, Mast. sensu Ridl. Flora of Sing. in Journ. Roy. As. Soc. Str. Br. XXXIII(1900) 51 pro parte; Ridl. Flor. Mal. Pen. I(1922) 265, pro parte.

Singapore, Chan Chu Kang (Ridley, n. 3770, flrs. in 1890); Kranji (Mat. n. 5846, flrs. 1894); near Cluny Road in Tanglin (Furtado, flrs. in Feb. 1924).

Distribution—Sumatra.

C. X. FURTADO.

**ANISOPHYLLEA GAUDICHAUDIANA, Baill. is
A. GRANDIS, Benth.**

About 1823 (the date is unrecorded) George Porter, at one time Head-Overseer of the East India Company's Botanic Garden in Calcutta and then a schoolmaster in Penang, collected in this island and sent to Calcutta a curious plant to which Wallich gave the number 4454 and the name *Strychnos grandis*. But Bentham when he elaborated his account of the Loganiaceae, to which family *Strychnos* belongs, pointed out (Journ. Linn. Soc., 1, 1857, p. 79) that Porter's plant is not even a member of the Loganiaceae, but a species of the genus *Anisophyllea* or *Anisophyllum* in the Rhizophoraceae: and he described it under the name of *Anisophyllum grande*.

In 1836 Gaudichaud collected in Penang specimens of the same plant, and these served as the basis of Baillon's description of *Anisophyllea Gaudichaudiana* (*Adansonia*, 11, 1875, p. 311), a name found in our text books, whereas Bentham's has been overlooked. But Bentham's name long antedates Baillon's, and must be restored as *Anisophyllea grandis*.

Porter collected other specimens of the same plant which Wallich distributed as no. 4976 under another singularly unfortunate name—*Cocculus flavicans*. These specimens are dated 1823. Maingay also collected it; and yet a fifth name, *Anisophyllea grandifolia*, G. Henslow, was bestowed when his specimens were examined for the Flora of British India.

I. H. Burkill.

OBITUARY.

CHARLES CURTIS.

Charles Curtis had charge of the Waterfall Gardens, Penang, from their foundation in 1884 until 1903, when he was obliged to retire through ill health. He died on Aug. 16th, 1928, at the age of 75 years, at Barnstaple, Devonshire.

From 1878 until 1884 he was employed by the firm of James Veitch & Sons as travelling collector, visiting Madagascar, Borneo, Sumatra, Java and the Moluccas. During these years he obtained many fine plants for cultivation, notably *Nepenthes Northiana*, one of the most remarkable of Bornean pitcher plants.

His initial appointment at Penang was that of Assistant Superintendent of Forests, and the Waterfall Gardens was then started primarily as a nursery for economic plants. From the first, however, some ornamental gardening was carried out, and it soon developed into a garden of great beauty, in its naturally beautiful setting. When the administration of Forests passed from the Gardens Department in 1895, Mr. Curtis was able to devote most of his time to the Waterfall Gardens, which remain as a monument of his service. He was a very capable horticulturist, and devoted himself with great energy and enthusiasm to his duties. He was also an active botanical collector, and added considerably to our knowledge of the Malayan Flora. Numerous plant species are associated with his name, and the genus *Curtisina*. He published a list of the plants of Penang Island in the Journal of the Straits Branch, Royal Asiatic Society, no. 25 (1894) and various papers on horticultural topics in the Agricultural Bulletin of the S.S. and F.M.S.

CHARLES FULLER BAKER.

We record with great regret the death of Charles Fuller Baker, Dean and Professor of Tropical Agriculture, College of Agriculture, Los Banos (University of the Philippines), who during a period of leave in 1917 acted as Assistant Director of the Botanic Gardens, Singapore. He died on July 22nd 1927, of chronic dysentery, within a few months of the date fixed for his retirement. He was 55 years of age. Throughout his life he devoted the greater part of his spare time to the accumulation of enormous and very valuable collections of insects and plants (particularly fungi) chiefly from the oriental tropics. While in Singapore he collected numerous insects and fungi, and contributed various short papers to Volume 2 of this Bulletin.

Rainfall.

At the head of the Waterfall Gardens, Penang during the first half of the year, 1927, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang.

Date.	Jan.	Feb.	March	April	May	June
1	.		·44	·26	·12	.
2	...	...	·04	1·97	·04	..
3	·17	·03	·92	6·05	·03	1·85
4	·03	·03	·56	·26	·14	...
5	·07		·36	·11		...
6	·11	.09	·30	·10	...	...
7	·97	·06	...	...	...	·02
8	·05	·03	·80	·14	·32	·33
9	1·56	·43	...	2·92	·72	·37
10	·48	...	..	...	·67	·30
11	...	...	...	·15	3·90	·25
12	...	...	...	·03	·88	...
13	...	...	..	·04	·12	...
14	...	·49	·23	·14	·40	·12
15	...	...	·48	2·11	·02	...
16	·21	...	·53	...	·33	·09
17	·04	..	·35	·03	·33	...
18	...	·98	·50	...	.	·57
19	...	·30	...	2·67	..	·72
20	·06	·03	·06	·05	·39	·77
21	...	·06	·05	·47	·35	·02
22	...	·03	·03	...	...	·65
23	..	·14	·03	1·59	..	·07
24	·07	·03	·03	·83	·27	·03
25	·22	·03	·12	·15	..	2·33
26	...	·04	·52	1·15	...	·05
27	·08	·03	·80	1·18	·19	...
28	...	·62	.	·18	·60	...
29	...	...	1·29	·46	...	...
30	...	...	·03	·27	...	...
31	...	...	·48	...	...	...
	3·64	3·45	8·95	23·25	9·82	8·54

Rainfall.

429

At the head of the Waterfall Gardens, Penang during the second half of the year, 1927, in inches.

Readings taken at 8 a.m. and credited to the date in which the twenty-four hours begin. Data kindly supplied by the Municipal Commissioners of George Town, Penang

Date.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	...	·25	...	.	2·32	.
2	1·32	·10	...	1·28	...	.
3	11	1·20	03	26	09	..
4	97	1·66	·46	·62	2·48	...
5	·48	75	1·41	2·10	1·20	...
6		08	·16	1·79	·30	...
7	1·53	.	·13	1·64	.	
8	·03		·98	·06	·03	...
9	...	...	...	·36	·17	2·46
10	·03	...	12	·41	31	·02
11	·07	...	74	·58	12	·55
12	·73	...	·59	03		
13	23	...	33	.	·05	...
14	...	...	...	·10	·03	·04
15	...	...	·58	·28	..	...
16	..	...	·75	·02		·02
17	·25		·90	...	·15	...
18	·14	2·15	1·08		2·55	...
19	·21	·38	1·28		·06	...
20	·75	1·99	·67	1·12	..	·02
21	...	·24	4·98	..	...	...
22	·09	·59	·05	42	·16	...
23	·05	·03		·07	·13	·29
24	...	24	·90	·66	·22	1·78
25	·05	·32	·84	·05	...	...
26	...	·32	·17	·64	...	...
27	...	...	·63	·27	...	...
28	...	...	·03	·03	...	·60
29	...	...	...	·08	.	·18
30	...	...	1·89	·38	·63	·03
31	·04	·14	...	1·22	...	1·72
	7·08	10·44	19·76	13·87	11·00	7·71

Rainfall.

At the Botanic Gardens, Singapore, during the first half of the year 1927.
Readings taken at 9 a.m. and expressed in inches.

Date.	Jan.	Feb.	March	April	May	June
1	3.94	2.07	.	.79	.01	
2	.91	.40	..	.01	.70	
3	.24	1.22	.	.01	1.60	.01
4	.06	.05	.99	.03	.66	.25
5	trace	.07	3.76	.07	trace	.16
6	.01	.07	.29	trace	trace	..
7	..	trace	.27	.	.57	..
8	.02	..	.31	.06	.03	..
9	.14	..	1.21	.13	1.39	.15
10	.99	.01	.02	.30	.	1.39
11	.03	.31	...	...	...	trace
12	1.27	.12	...	...	.62	.11
13	trace	.15	...	1.64	..	...
14	1.01	.19	..	..	..	..
15	2.35	.03	.11	...	.15	.
16	.06	1.29	...	..	.07	..
17	.18	trace		.08	.28	.03
18	trace	..	.21	.14	.26	...
19	1.41		2.89	1.89	..	.05
20	.21	.60	2.01	1.47	1.12	.12
21	.08	.82	.06	.13	.23	.38
22	...	.20	.05	1.27	.13	.04
23	.06	...	1.87	.55	...	.13
24	1.37	.01	.04	.84	...	trace
25	.01	...	.06	.89	.03	.37
26	...	.01	...	.16	.02	.15
27	trace	.95	trace	..	.21	.94
28	1.68	2.40	.09	.06	...	trace
29	.62	..	...	1.72	.76	..
30	.03	...	.41	.68	...	...
31	1.64	...	2.15	...	...	...
	18.82	10.97	16.80	11.83	9.14	4.58

Rainfall.

431

At the Botanic Gardens, Singapore, during the second half of the year 1927.
Readings taken at 9 a.m. and expressed in inches.

Date.	July	Aug	Sept	Oct	Nov.	Dec.
1		trace	...	2.45	..	.09
2	.02	.	.02	.40	1.15	.24
3	1.31	.13	.08	.20	.20	.08
4	.06	...	trace	.91	.	.06
5	.52	...	1.31	trace	.50	.01
6	.10	.11	trace	.56	.31	.09
7	.01	.07	..	.17	.08	trace
8	.13	...		.56	1.13	.01
9	.04	...	..	.36	.71	
10	.89	..	...	...	trace	...
11	trace			.	3.18	1.52
12	.03	.27	.11	...	trace	.59
13			.03	.01	.02	.21
14	.	.01	.		.01	.07
15		trace		.11	.27	.
16	.29	.02	...	.	trace	.15
17	.41	trace	.44	...	.13	...
18	.07	...	...	...	.01	.01
19			.09	...	.05	trace
20	.16	.92	...	...	.04	.08
21	...	.19	.03	trace	.13	.02
22	...	1.46	.46	.16	..	.04
23		1.31	.07		.07	.49
24	.	trace	.54	trace	.99	2.59
25	...	.04	.06	.22	.13	.01
26	..	...	1.22	.34	.12	3.67
27		.80	.36	.70	.01	.51
28	...	.04	.02	.01	..	.57
29	..	...	...	.03	.04	.22
30	...	.	.78	.35	trace	trace
31	...	..	..	.49	.	.02
- - -	3.98	5.37	5.65	7.97	9.28	11.35

Summary of Rainfall 1927.

	SINGAPORE.				PENANG.			
	No. of rainy day	Amount of Rain. Inches.	mm	Longest spell without rain.	No. of rainy days	Amount of Rain Inches.	mm	Longest spell without rain
Jan.	28	18·32	465	1 day	14	3·64	92	5 days
Feb.	22	10·97	279	2 days	18	3·45	88	4 ..
Mar.	20	16·80	427	4 ..	23	8·95	227	5 ..
April	23	11·83	300	3 ..	25	23·25	590	1 ..
May	21	9·14	232	2 ..	19	9·82	249	3 ..
June	18	4·58	116	4 ..	17	8·54	217	4 ..
July	15	3·98	101	11 ..	18	7·08	180	5 ..
Aug.	17	5·37	136	4 ..	16	10·44	265	11 ..
Sept.	18	5·65	143	5 ..	24	19·70	500	2 ..
Oct.	21	7·97	202	5 ..	25	13·87	352	3 ..
Nov.	26	9·28	236	1 day	18	11·00	279	5 ..
Dec.	27	11·35	289	2 days	12	7·71	196	8 ..
Total.	256	115·24	2926		229	127·25	3215	

Greatest amount in 24 hours 3·94'

or 100 mm.

6·05 inches or 154 mm.

Greatest amount in 48 hours 4·90'

or 124 mm.

8·02 inches or 204 mm.

Greatest amount in 72 hours 6·27'

or 159 mm.

8·28 inches or 210 mm.

Periods in which more than 5 ins. fell
in 72 hours. 3 (Jan. Mar. Dec.)

4 (April, May, Sept., Oct.)

Periods in which less than ·02 ins. fell
in 120 hours. 6 (May-June, July, Aug.,
Sept., Oct. (2)).

9 (Jan., Jan.-Feb., March, May-
June, June-July, Aug., Nov., Dec.)

Relative Humidity of the air at the Botanic Gardens, Singapore, from wet and dry bulb hygrometer readings made daily at 9 a. m. during the year 1927.

Date	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	95	100	73	81	83	81	85	79	81	100	77	72
2	80	81	76	77	91	79	75	73	72	95	91	76
3	93	93	76	79	95	80	95	75	79	78	78	80
4	74	90	83	90	85	95	98	75	76	91	83	73
5	76	82	91	81	78	83	98	81	100	78	92	86
6	86	83	87	83	83	76	80	83	81	90	83	86
7	76	75	77	83	98	83	75	89	70	98	68	79
8	75	71	87	86	85	79	95	75	84	71	87	82
9	70	79	91	76	90	91	81	68	79	91	100	67
10	90	83	79	91	73	93	98	72	64	65	72	83
11	67	82	85	81	71	72	79	70	72	74	98	83
12	86	75	79	83	81	93	87	75	81	70	79	85
13	73	75	74	81	70	81	83	79	77	74	79	95
14	75	75	68	71	83	79	85	76	75	77	83	93
15	76	84	68	78	87	74	81	76	70	79	75	79
16	86	79	73	76	90	76	83	76	69	66	71	68
17	82	72	75	79	83	73	95	72	89	70	72	84
18	71	72	76	77	79	68	81	72	71	67	93	79
19	77	76	87	83	79	79	79	75	77	69	91	76
20	77	87	74	97	83	95	79	95	76	72	93	86
21	75	95	75	72	76	91	83	89	79	65	95	72
22	82	74	83	98	79	91	79	97	95	72	62	74
23	82	75	76	83	83	95	79	86	75	81	76	95
24	81	75	91	85	72	81	81	82	79	75	97	81
25	86	70	84	77	87	95	79	86	82	72	89	85
26	87	83	70	76	87	71	79	75	93	70	91	95
27	79	76	74	79	91	85	77	95	95	85	80	71
28	95	87	83	83	79	75	76	79	83	75	71	89
29	78		72	98	77	76	76	83	72	76	79	86
30	80		67	87	80	76	79	75	72	76	66	79
31	95		81		76		76	68		77		72
	80.8	80.2	78.5	82.6	82.4	82.2	83.2	79.0	78.9	77.3	82.5	81.4

CORRIGENDA in the Gardens Bulletin Vol. IV Nos. 2 & 3.

- p. 51, line 10, *for* 11912 *read* 11910
- p. 56, line 20, *for* 17210 *read* 17310
- p. 58, line 8 from bottom, *for* 9 cm. *read* 9 mm.
- p. 68, line 13, *for* found *read* founded
- p. 69, line 8, *for* Denstaestia *read* Dennstaedtia
- p. 69, line 17, *for* Odontosoris aculata *read* Odontosoria aculeata
- p. 77, line 6 from bottom *for* exclusively *read* extensively.
- p. 78, line 18 *for* as Tanjong Malim *read* at Tanjong Malim
- p. 87, *delete all except:* A fruiting spike of *Disoscorea tamarisciflora*, nat. size.

CORRIGENDA in the Gardens Bulletin Vol. IV Nos. 4 & 5.

- p. 114, line 15, *delete the words* the data on which are *repeated*.
- p. 116, *under* ARDEN, Stanley, *read* (1900—1906) *for* (1900—190).
- p. 118, *under* BURN-MURDOCH, Alfred M. *read* (1868—1914) *for* (1868—1919)
- p. 120, *for* DOCTORS van LEEUWEN, W. *read* DOCTERS van LEEUWEN, W.
- p. 120, *for* DURNFORD, *read* DURNFORD, J.
- p. 124, *for* HOBSON, *read* HOBSON, S.G., *and in the next line substitute the words* Posts and Telegraphs *for the word* Survey
- p. 125, *for* ICIEBESTA, Rev. Father *read* SCHEBESTA, Rev. Father Paul
- p. 125, *for* JUPP, *read* Jupp, John.
- p. 125, *for* KELSALL, Colonel J. H., *read* KELSALL, H. J., *and in the next line substitute the word* Artillery *for the word* Engineers.
- p. 126, *for* LEDOUX, J. A. *read* LE DOUX, J. A.
- p. 127, *after* LOW, Sir Hugh, *add* (1824—1905).
- p. 128, *under* "MAT," *for* Becker *read* Becher.
- p. 128, *under* MOORHOUSE, S.W., *for* 1903—190, *read* 1903—1905.
- p. 128, *insert* MARTENS, Eduard von,
A zoologist attached to the Prussian Expedition to East Asia of 1860—1863, son of Professor Georg von Martens for whom he collected sea-weeds. Those which he collected in the harbour of Singapore in March, 1862, were enumerated in "Die preussische Expedition nach Ost-Asien, Die Tange," Berlin, 1866.

- p. 132, *under T* for Gideow Thompson read Gideon Thomson.
- p. 133, *under VIENNING*, Alfred Reid, for 1908 read 1927.
- p. 133, *under WAWRA von FERNSEE*, the Ritter Heinrich, for Prinzen read Prinzen.
- p. 134, *under WOLFFERSFAN*, Littleton Edward Pipe, for 1889—191 read 1889—1922.
- p. 140, line 22, for Kangsar read Kangar.
- p. 145, line 5 from the bottom, for forests read forties.
- p. 147, line 9, for Culeutta read Calcutta.
- p. 150, line 2, insert 1895.
- p. 151, line 18 from the bottom, after the word April, read and later he was on the Piah river.
- p. 152, line 19, insert "September, 1922"
- p. 154, line 4 from the bottom, for Caulfield's read Caulfeild's
- p. 155, line 18 from the bottom, for Stevens read Stephens.
- p. 155, line 9 from the bottom, for of read or.
- p. 163, line 20, for 1923 read 1903.
- p. 169, line 9, add February, 1904.
- p. 172, line 25, delete the words Telok Malati.
- p. 180, line 11, for Chang read Cheng.
- p. 181, line 17, for Cavanagh read Cavenagh.
- p. 184, line 18, for Harvey read Hervey.
- p. 184, line 20, for at his death read in 1891.
- p. 186, line 9 from the bottom, read Down in 1911.
- p. 195, against Bukit Raja Wang, for 2b read 2a.
- p. 195, after Bukit Wok, add 4f.
- p. 195, for Changkat Jerin read Changkat Jiring.
- p. 198, against Kuala Pilah, for 6e read 6j.
- p. 200, for Sungei Biku read Sungei Bekok.

CORRIGENDA in Gardens Bulletin Vol. IV, Nos. 6 & 10.

- p. 382, fourth line from bottom of page, for
Pilea muscosa, Lindl., Common in K. Lumpur. read
Pilea calcarea, Ridl. Batu Caves (Burkill, Ridley).

INDEX TO VOL. IV.

Names of new species are printed in bold-faced type.

- Abnormalities in Coco-nut Palms, 78
Acanthocladium, 33, 36, 40
Acroporium, 40-45
Acryanthes, 101
Actinodaphne, 101
 Additions to the Flora of the Malay Peninsula, 48, 411
 Additions, further, to the Flora of the Malay Peninsula, 415
 Additions to the List of Fraser Hill Plants, 92
Adenosma, 417
Adiantum, 396
Adinandra, 94
Aerobryopsis, 23
Aeschynanthus, 100.
Agapetes, 98
 Albino seedlings in Coco-nut Palms, 81
Alocasia, 105
Alpinia Burkillii, **Hend.**, 55
Alsophila, 378, 379
Alstonia, 99
Amorphophallus, 105
Ananas sativa, 85
 " " fasciation in, 85
 " " proliferation in, 85
Anisophyllaea Gaudichaudiana, **Baill.**, 126
Anisophyllaea grandis, **Benth.**, 126
Anisophyllum, 126
Anneslea, 94
Aphanamixis, 95
Aporosa, 103
Appendicula, 104
Aralia, 97
Aralidium, 98
Areca, 104
Argostemma, 98
Artabotrys, 93
Arthrocomus, 9
Artocarpus, 103
Aspidium, 390, 392-394, 405
Asplenium, 400, 401
Baccaurea, 103
Baker, Charles Fuller, 427
Balanophora, 102
Bambusa, 105
Barbula, 17, 18, 91
Bassia, 419
Begonia, 97
 Botanical Collectors, Collections and Collecting Places in the Malay Peninsula, 113
Brachytome, 98
Brassaiopsis, 97
Braunfelsia, 3, 4
Bryum, 19, 20, 91
Bulbophyllum, 101
Burkill, on *Anisophyllaea*, 126
 " on *Carallia suffruticosa*, 77
 " on Collectors, Collections and Collecting Places in the Malay Peninsula, 113
 " on History of the Dell in the Singapore Gardens, 69
 " and *Prain*, on *Dioscorea tamarisciflora*, 86
Callicarpa, 100
Callicostella, 27, 91
Calophyllum, 93
Calymmodon, 103
Calymperes, 11-17, 90, 91
Campylodontium, 25
Campylopodium, 3
Campylopus, 5, 6, 89
Canthium, 98
Carallia spinulosa, **Ridl.**, 77
 " *suffruticosa*, **Ridl.**, 77
Casuaria, 97
Cephaelis, 98
Ceratodon, 3
Ceratostylis, 104
Chaetomitrium, 27, 28
Chelistonele, 104
Chionoloma, 17
Chisocheilon, 95
Christensen, on Some Ferns from the Malay Peninsula, 375
Cladopodanthus, 7
Clerodendron, 100
Cocculus, 426
 Coco-nut Palms, Abnormalities in, 78
 Coco-nut Palms, Albino seedlings in, 81
 " Development of usually abortive ovary in male flowers, 81
 " Horned Coco-nuts, 83
 " Polyembryony in, 78
 " Suppression of spikelets in spadices in, 81
Cordyloblaste, 99
Cratoxylon, 93
Crepidomanes, 377
Cribrodontium, 25
Cryptocarya, 101
Ctenidium, 30
Curtis, Charles, 427

- Curtisina, 427
 Cyathea, 379
 Cyclophorus, 406

 Dacmonorops, 104
 Davallia, 399
 Dennstaedtia, 399, 400
 Desmotheeca, 18
 Dieranella, 3
 Dieranodontium, 6
 Dieranoloma, 4, 5
 Didymocarpus lancifolia, Hend., 52
 Didymoglossum, 377, 378
 Dioscorea tamarisciflora, Pr. & Burk., 86
 Diphyscium, 21
 Diplazium, 67, 401, 402
 Dipteris, 57
 Dischidia Fultonii, Hend., 51
 Distichophyllum, 26, 27
 Ditrichum, 3
 Dixon, on Mosses from the Malay Peninsula, 1
 Dracaena, 104
 Drepananthus pahangensis, Hend., 49
 Dryopteris, 68, 379-393
 Dryopteris pectiniformis, C. Chr., 379
 Dysoxylon, 95

 Ecdysanthera, 99
 Ectropothecium, 30-32, 91
 Elaeocarpus, 94
 Elytranthe, 102
 Embelia, 99
 Endotrichella, 23
 Engelhardtia, 103
 Entodon, 25
 Ephemeropsis, 26
 Eria, 104, 414
 Eriopus, 27
 Fryxibe, 100
 Esenbeckia, 424
 Euramptodon, 42
 Eugenia, 96
 Eupatorium, 412
 Eurycoma, 95
 Evodia, 94
 Exodictyon, 9

 Fagraea, 99, 412
 Fasciation in Ananas sativa, 85
 Ferns from the Malay Peninsula, 375
 Ferns, New Species of, from the Malay Peninsula, 408
 Ficus, 103
 Fissidens, 9, 10, 89
 Flora of the Malay Peninsula, additions to, 48, 411
 Flora of the Malay Peninsula, further additions to, 415
 Floribundaria, 23
 Flowering Plants of Kuala Lumpur (indexed separately), 211
 Fraser Hill, addition to list of plants of, 92
 Funaria, 19
 Furtado, on abnormalities in Coco-nut Palms, 78
 Furtado, on Ananas sativa, 85
 „ on further additions to the Flora of the Malay Peninsula, 415
 „ on Neesia in the Malay Peninsula, 421
 „ on Ocimum in the Malay Peninsula, 416, 417
 „ on Palaquium stellatum, K. & G., 419

 Gaertnera, 100
 Galearia, 103
 Garcinia, 93
 Garckea, 3
 Gardeniopsis, 98
 Garovaglia, 23
 Gironniera, 103
 Gleichenia, 61, 66
 Glycosmis, 94
 Gomphandra, 95
 Gomphostemma, 101
 Goniiothalamus, 93
 Goniiothalamus rotundisepalus, Hend., 48
 Gordonia, 94
 Gymnogramme, 405
 Gymnostomiella, 18
 Gynotroches, 96

 Helicia, 102
 Helicteres, 111
 Hemieraphis, 51
 Henderson, on additions to the Flora of the Malay Peninsula, 48, 111
 „ on Flowering Plants of Kuala Lumpur, 211
 „ on Fraser Hill plants, 92
 Henslowia, 102
 Herpestis, 51
 Himantocladium, 21
 History of the Dell in the Singapore Gardens, 69
 Holtum, on Mosses collected in the Singapore Gardens, 88
 Holtum, on a new Fern from the Malay Peninsula, 56
 „ on new species of Ferns from the Malay Peninsula, 408
 „ Notes on Malayan Ferns, 57
 Homaliodendron, 24, 25
 Homalomena, 105
 Horned Coco-nut, 83

- Humata, 398
 Humidity in Singapore, 1925, 110;
 1926, 205; 1927, 433
 Hydnocarpus, 93
 Hydrocotyle, 97
 Hymenophyllum, 376, 408, 409
 Hymenophyllum johorensis,
 Holtum, 408
 Hymenostomum, 17
 Hyophila, 17
 Hypnodendron, 45, 46, 92
 Hypnum, 41
 Hypolepis, 68
 Hypopterygium, 28
 Hyptis, 415, 417

 Ilex, 95
 Illigera, 102
 Impatiens Foxworthyi, Hendl., 50
 Isoloma, 398
 Isopterygium, 32, 33, 91, 92

 Justicia, 100

 Kadsura, 93
 Knema, 101
 Kuala Lumpur, Flowering Plants
 of, (indexed separately), 211

 Laportea, 103
 Lastraea, 379-381, 384, 385, 388,
 389, 392
 Lepionurus, 102
 Leptochilus, 391, 395, 103
 Leptochilus malaccensis, C. Chr.,
 391
 Leptochilus simplicifolius,
 Holtum, 109
 Leucobryum, 7, 89
 Leucoloma, 5
 Leucomium, 36
 Leucophanes, 8, 89
 Lindsaea, 102
 Lindsaya, 61, 396-398
 Litsa, 102
 Lomariopsis, 395
 Loranthus, 102
 Loranthus pekanensis, Hendl., 55
 Loxocarpus, 112
 Loxocarpus Holtumii, Hendl., 412
 Loxocarpus papillosa, Hendl., 53
 Loxogramme, 405, 406
 Lygodium, 66

 Macaranga, 103
 Macrohymenium, 45
 Macromitrium, 18, 19, 91
 Madhuca, 419
 Maesa, 95
 Malay Peninsula, additions to
 Flora of, 48, 411
 Malay Peninsula,
 Ferns from, 375
 " further additions to
 Flora of, 415
 Malay Peninsula, Neesia in, 421
 " Ocimum in, 416
 " new species of Ferns
 from, 408
 Malayan Ferns, notes on, 57
 Mastixia, 97
 Mastopoma, 36
 Medinilla, 97
 Meiothecium, 37, 92
 Melanorrhoea, 95
 Meliosma, 95
 Memecylon, 97
 Meteorium, 23
 Microtus, 3, 89
 Microlepia, 398, 399
 Mniodendron, 46
 Mniomalia, 19
 Mnium, 20
 Monogramme, 407
 Mosses collected in the Singapore
 Gardens, 88
 Mosses in the Malay Peninsula,
 List of, 1
 Myurium, 22, 91

 Neckeropsis, 23, 24
 Neesia in the Malay Peninsula,
 121
 Nepenthes, 427
 Nephrodium, 380, 381, 385, 387-
 392, 105
 Nephrolepis, 398
 Nothaphoebe, 101
 Nyssa, 98

 Ochobryum, 8
 Ochradocarpa, 100
 Ocimum in the Malay Peninsula,
 416-419
 Octoblepharum, 9
 Ormosia, 96
 Orthorrhynchium, 23

 Palaquium stellatum, K. & G., 119
 Palms of British India and Ceylon
 (Review), 203
 Pandanus, 105
 Papillaria, 23
 Paraboea Holtumii, Hendl., 53
 Parinarium, 96
 Pasania, 103, 104
 Paysona, 99
 Pelekium, 29, 91
 Pentaphyllax, 94
 Perrottetia, 95
 Phegopteris, 391-393
 Philonotis, 21
 Phoebe, 101
 Photographs of the Singapore
 Gardens, 47
 Phreatia, 101
 Phyllagathis, 97
 Phyllanthus, 417
 Phytocrene, 51

Pilotrichella, 28
Piloecium, 45
Pinnatella, 25
Piper, 101
Pithecolobium, 96
Plagiothecium, 33, 92
Plectopteris, 403
Pleopeltis, 404, 405
Pogonatum, 21, 22
Pogostemon, 417
Polyalthia, 93
Polygala, 93
Polypodium, 65, 68, 69, 389, 391,
 393, 402-406
Polystichum, 393
Pomazota rivularis, Hend., 411
Pothos, 105
 Prain, and Burkill on *Dioscorea*
tamarisciflora, 86
 Proliferation in *Ananas sativa*, 85
Prosaptia, 403, 404
Pseudanthemum, 100
Psychotria, 98
Pycnanthemum, 415
Pygeum, 96
Pyrus, 96

 Rainfall in Penang, 1925, 108,
 109; 1926, 208, 209; 1927, 428,
 429
 Rainfall in Singapore, 1925, 106,
 107; 1926, 206, 207; 1927, 430,
 431
 Rainfall, Summary of, 1925, 111;
 1926, 210; 1927, 432
Rauwolfia, 99
Rhacelopus, 21
Rhacopilum, 29
Rhaphidostegium, 37, 38, 92
Rhizogonium, 20
Rhodobryum, 20
Rhynchostegium, 45
Rivinia, 415

Saccoloma, 399, 400
Saraca, 96
Schefflera, 97
Schismatoglottis, 105
Schistomitrium, 8
Schizoloma, 68
Scleria, 105
Scleroglossum, 406, 407
Selliguea, 405
Sematophyllum, 40, 41, 42, 44
Sideroxylon, 99
Sigmatella, 34
 Singapore Gardens, History of
 the Dell in, 69

Singapore Gardens, List of Mosses
 collected in, 88
 Singapore Gardens, Photographs
 of, 47
Sisik Puyuh, 77
Solanum, 100
Sonerila, 96, 411
Sonerila johorensis, Hend., 411
Sphagnum, 2, 3
Spirula, 7
Splachnobryum, 18
Steiropsis, 381
Stenochlaena, 59, 395
Sterculia, 94, 411
Stereodon, 32
Strobilanthes, 100
Strychnos, 99, 426
 Summary of Rainfall, 1925, 111;
 1926, 210; 1927, 432
Symphysodon, 23
Symplocos, 99
Syngamma, 64
Syngamma minima, Holttum, 56
Syrrophodon, 10-14, 90

Tapeinidium, 399
Tarenna, 98
Taxithelium, 33-35, 92
Teratological Notes, 78
Ternstroemia, 91
Tetractomia, 94
Thuidium, 29, 30
Thysanomitrium, 6
Thysanolaena, 105
Timonius, 98
Trachelospermum, 99
Trachythecium, 32
Trevesia, 97
Trichomanes, 376-378
Trichosteleum, 33, 34, 38-40, 92
Trichostomum, 17
Trichotosia, 104
Trismegistia, 37, 91
Tulang Daing, 77
Tupistra, 104
Tylophora, 99

Urophyllum, 98

Vesicularia, 32, 33, 36, 92
Viburnum, 98
Villebrunea, 103
Vittaria, 406, 107, 409
Vittaria malayensis, Holttum, 409

Wilsoniella, 3
Zanthoxylum, 94

